NATIONAL

TAPE RECORDER
SERVICE MANUAL

MODEL RQ-152S

A.C D.C 2 SOURCE TAPE RECORDER

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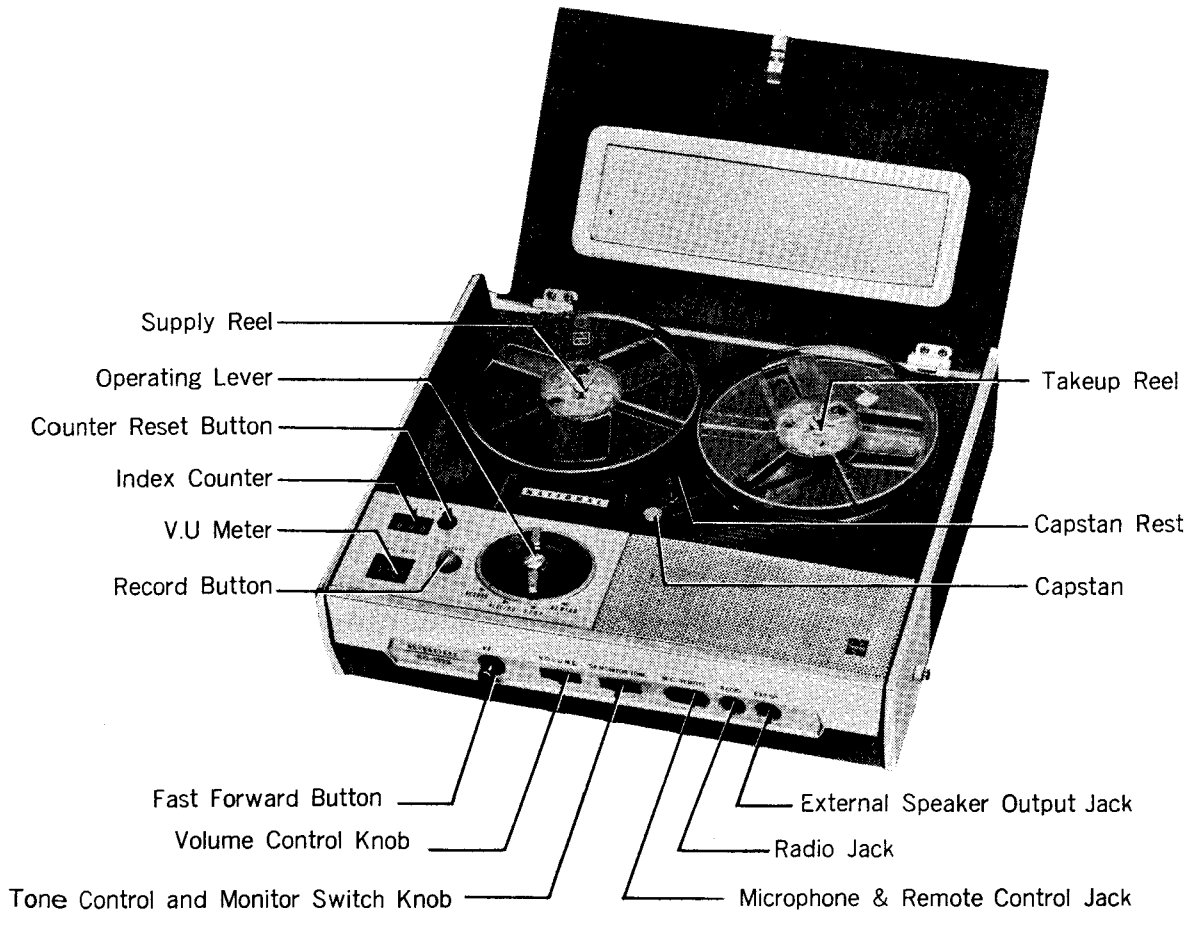
MATSUSHITA ELECTRIC

JAPAN

SPECIFICATIONS

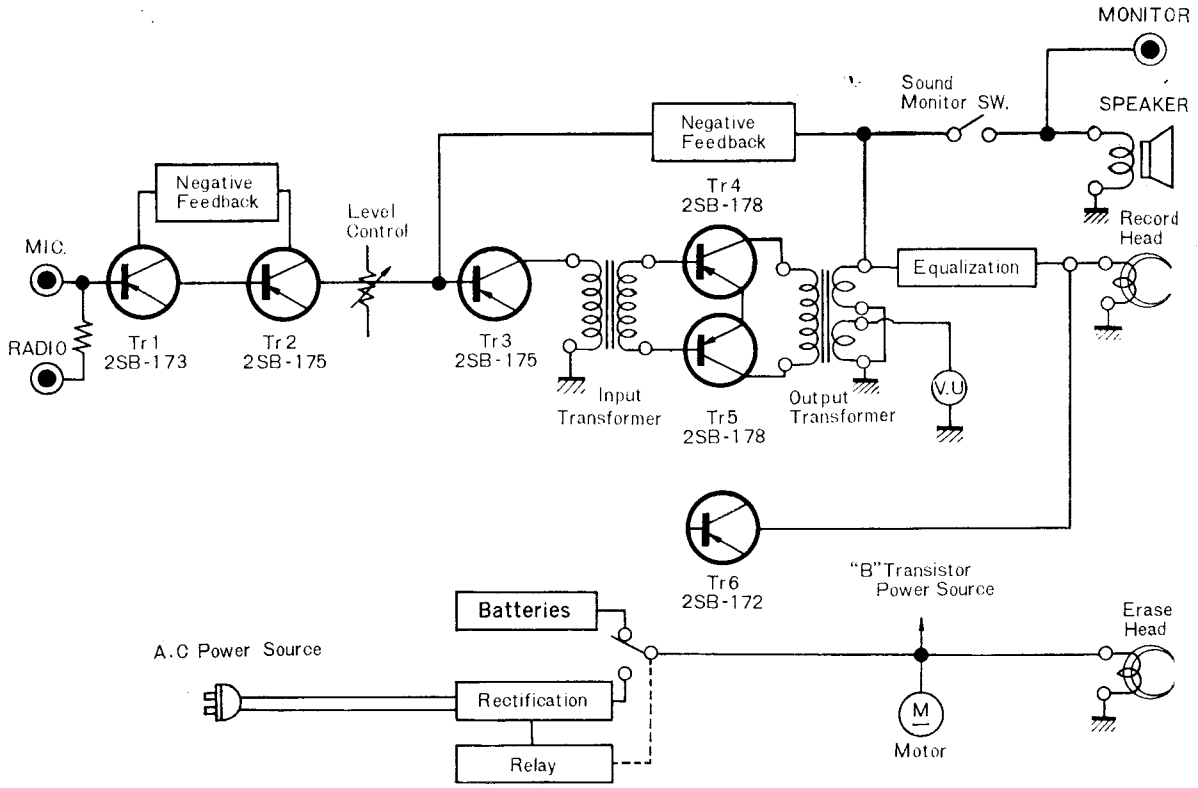
Power Source:	A.C. or Battery Powered A.C. 110V, 220V Battery 9V 6 Batteries
Audio Output:	700 mW (1W maximum)
Transistors:	2SB-173(1) 2SB-175(2) 2SB-178(2) 2SB-172(1)
Recording System:	A.C. Bias 35 K Cycles
Erasure System:	D.C. Erase
Track System:	2 Track System
Monitor Systen:	Sound Monitor System
Tape Speeds:	3-3/4 i.p.s. and 1-7/8 i.p.s.
Frequency Response:	100~7,000 c/s at 3-3/4 i.p.s. 100~4,000 c/s at 1-7/8 i.p.s.
Input Impedance:	Microphone 20 KΩ Auxiliary "RADIO" 100 KΩ
Output Impedance:	Extension Speaker Jack "EXT.SP" 8 Ω
Playing Time:	1 hour at 3-3/4 i.p.s. with 5″ Tape (600 ft) 2 hour at 1-7/8 i.p.s. with 5″ Tape (600 ft)
Battery Life:	More than 30 hours (using NATIONAL "Hi-Top" Batteries)
Recording Level Indicator:	V.U Meter
Built-in Speaker:	3-5/8″ Dynamic Speaker
Dimensions:	11-3/4″(W) × 10″(D) × 3-1/2″(H)
Weight:	6-3/4 lbs. without Butteries

PARTS LOCATION

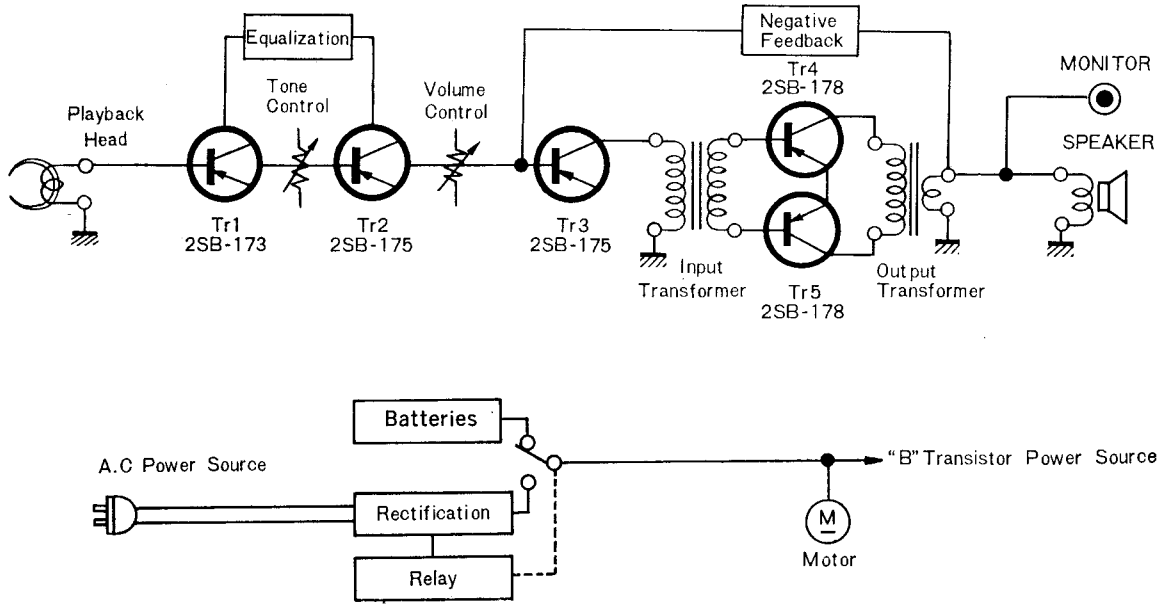


BLOCK DIAGRAM OF ELECTRICAL CIRCUITS

RECORDING CIRCUIT

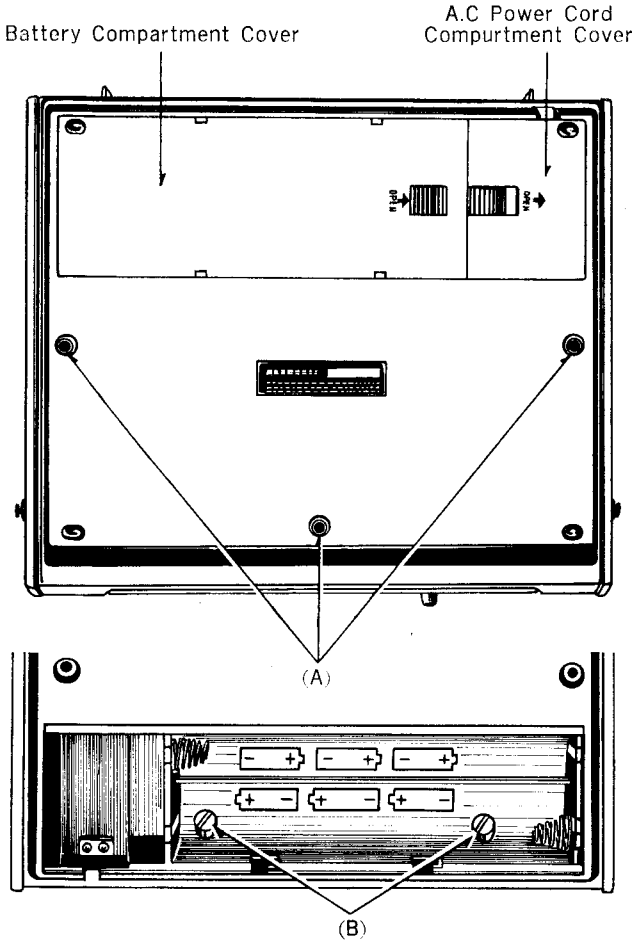


PLAYBACK CIRCUIT



DISASSEMBLY INSTRUCTIONS

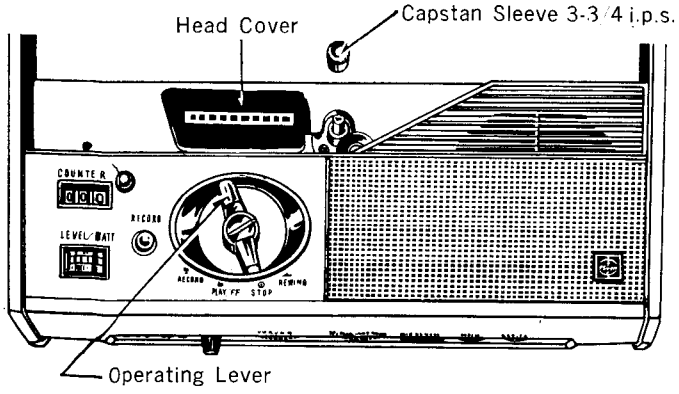
BOTTOM COVER



1. Turn the set upside down.
2. Undo the fixing screws 3 pcs. (A) of the Bottom Cover and the fixing screws 2 pcs. (B) inside of the Battery Case.
3. If it is lifted from the hinge side, the Bottom Cover can be removed.

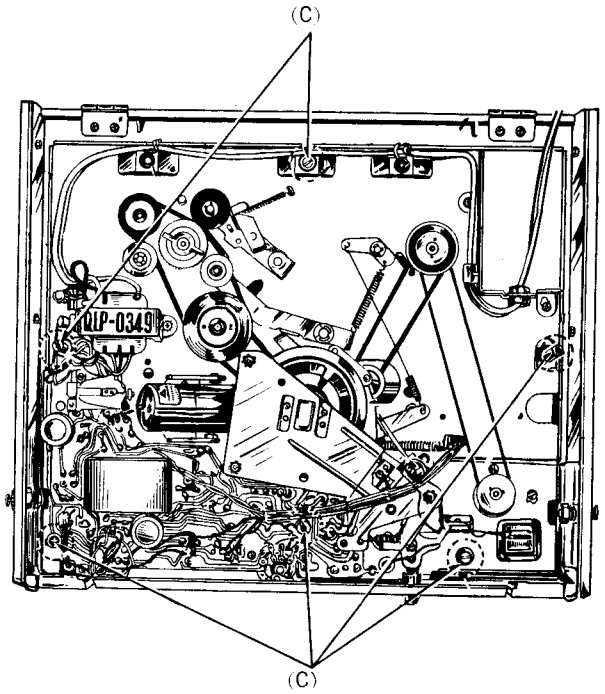
   Note: Attention must be paid to lead wire from Battery.

MAIN CABINET BODY CASE

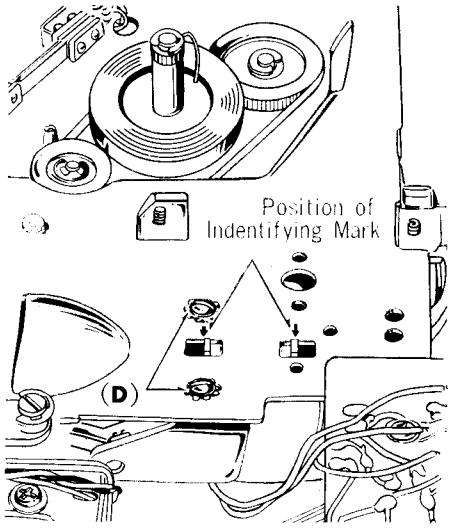


1. Remove the operating Lever and the capstan sleeve 3-3/4 i.p.s.
2. Remove the Bottom Cover.
3. Undo chassis fixing screws 6 pcs. (C).
4. Hold the Flywheel of chassis, and pull it up slopewise from Reel Table side.

   Note: Attention must be paid to lead wire from speaker.



MOTOR

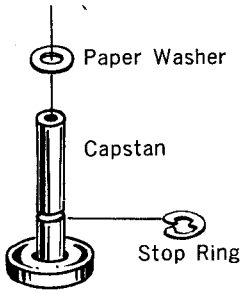


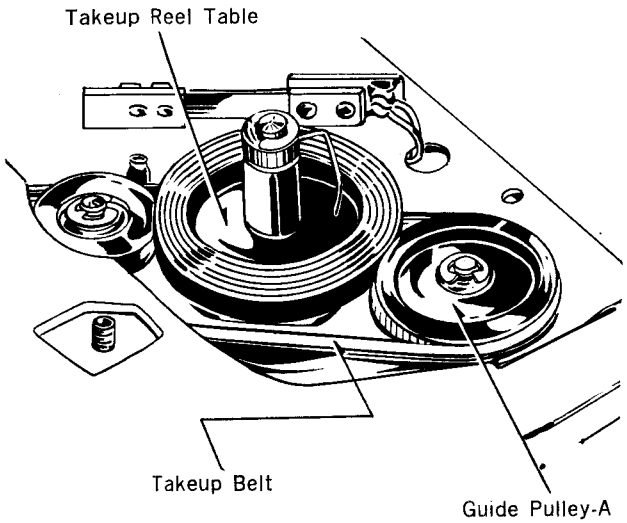
1. Remove the Motor Spring from the Motor.
2. Remove the 3 Motor Lead wires (Yellow, Red and Blue.)
3. Remove 2 screws (D) holding Motor Holder.
4. In doing so mark the original position of the Holder first.

   When replacing the Motor, fit it to the position marked When removing the old Motor, then test the tape speed.

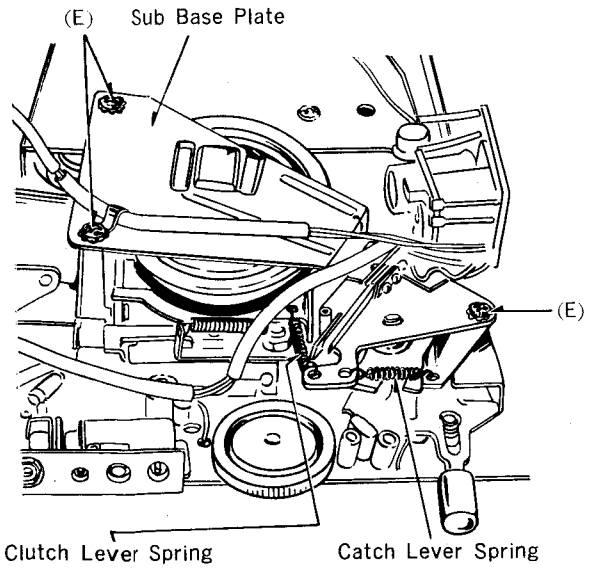
FLYWHEEL

1. Remove Paper Washer and Stop Ring on the Flywheel Shaft(Capstan).



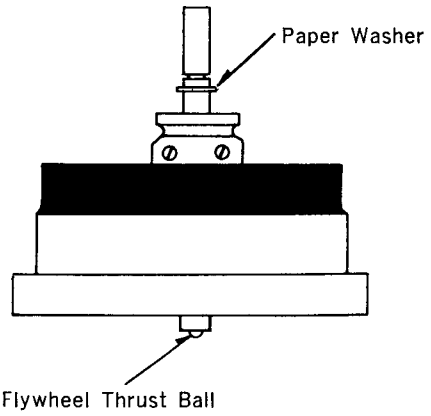


2. Remove the Rubber Belt from the Guide Pulley-A.



3. Remove the Catch Lever Spring and the Clutch Lever Spring.
4. Remove the 3 screws (E) holding the Sub Base Plate.
5. Remove the Sub Base Plate.
6. Pull the Flywheel upward.

When replacing the Flywheel, always install new Flywheel.
Thrust Ball and Paper Washers on the Flywheel Shaft



MECHANICAL OPERATING CONTROLS

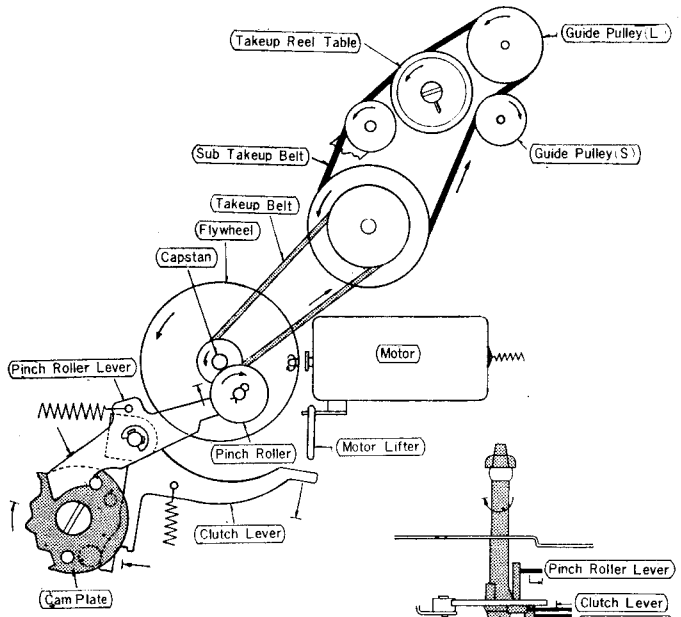
SINGLE LEVER CONTROL

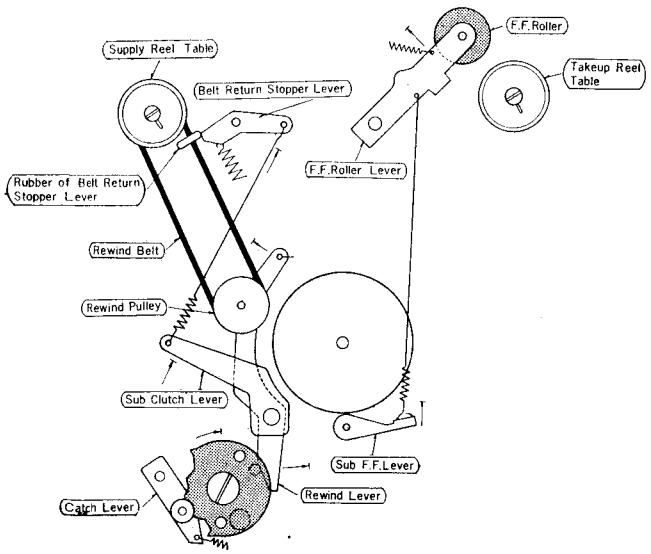
All electrical and mechanical functions are performed by the single, 4 position Operating Lever. The batteries are disconnected in the STOP position.

1. Turning the Operating Lever counter-clockwise to the PLAYBACK position switches the Amplifier ON and actuates the tape transport mechanism to properly Playback a recorded tape.
2. Turning the Operating Lever counter-clockwise to the REWIND position switches the Amplifier OFF and actuates the mechanism to cause transport of the tape onto the supply reel.
3. Pressing the Record/Lock Button and turning the Operating Lever to RECORD actuates the tape transport mechanism and switches the electrical circuits, to enable the signal from the microphone to be recorded. Record/Lock Button is a safety locking device to prevent accidental erasure.
4. Volume Control is used to adjust the recording level and volume of the reproduced sound. It is not connected to the Power Switch.
5. V.U Meter/Battery Voltmeter functions as a dual purpose meter. With the Operating Lever in the RECORD position, the meter functions as a V.U Meter and indicates the recording level. In the PLAYBACK position, the meter functions as a Voltmeter and measures the Voltage output of the batteries.
6. The Model RQ-152S is equipped with a self-contained AC power supply and a unique relay circuit which allows automatic switching from AC to Battery power and vica-versa.
   S4 is the AC to Battery switch contacts and normally is in the Battery position. When AC power is applied, S4 contacts are switched to the AC position by the Relay.

TAPE TRANSPORT OPERATION

PLAYBACK

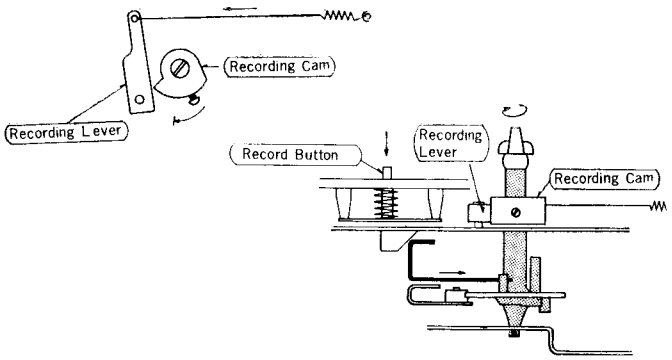




When the operator is adjusted to playback condition by turning the Operating Lever, the following movements occur at one time to feed tape at a constant speed for obtaining playback.

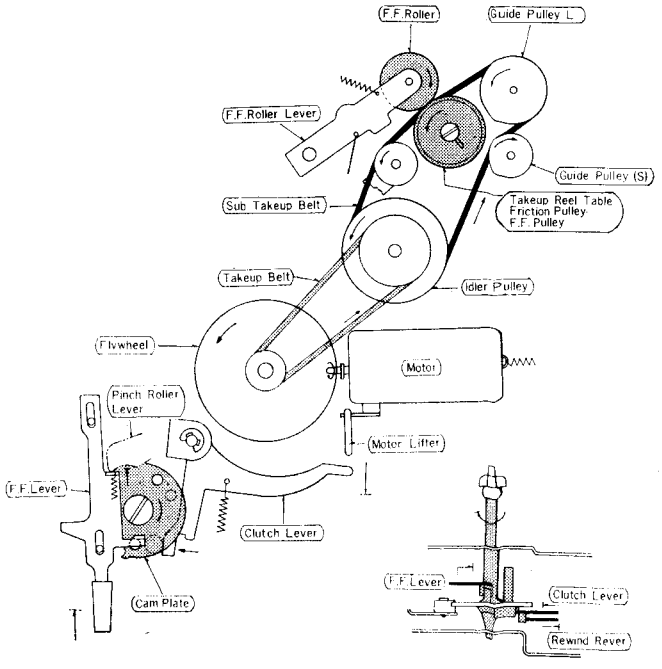
1. Clutch Lever acts, power source is switched on, Motor Lifter is freed from suppression, Motor is pressed on Flywheel, and motor rotation is transmitted to Flywheel.
2. Rotation transmitted to Flywheel turns Takeup Reel Table by Takeup Belt and Sub Takeup Belt.
3. Pinch Roller Lever acts and makes Pinch Roller stuck to Capstan Shaft. With rotation of Capastan Shaft which is conjointly shaft of Flywheel, Pinch Roller is rotated to feed tape at a constant speed.
4. Pinch Roller Lever moves pad arm and Pinch pad to Head.
5. Pinch Roller Lever moves Sub F.F. Lever and F.F. Roller Lever, and separates F.F. Roller from Takeup Reel Teble.
6. Rewind Lever is actuated, Rewind Pulley is separated from Flywheel, and playback circuit is switched on.
7. Sub Clutch Lever operates, moves Belt Return Stopper Lever and separates rubber of Belt Return Stopper Lever from Supply Reel Teble.
8. Catch Lever operates and fixes operator.

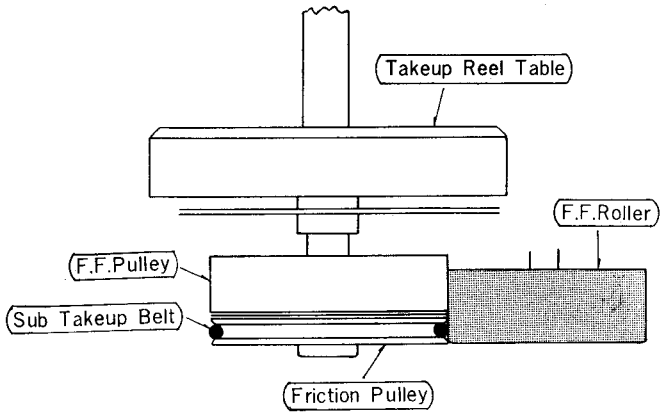
RECORD



Push the Button for recording, turn the Operating Lever, and adjust the operator to recording position. Then, same operations as in playback begin simultaneously and tape is fed at a constant speed. At the same time, Recording Lever is moved with Recording Cam, Slide Switch is actuated, electric circuit is changed over to recording condition, and thus recording is obtained.

FAST FORWARD

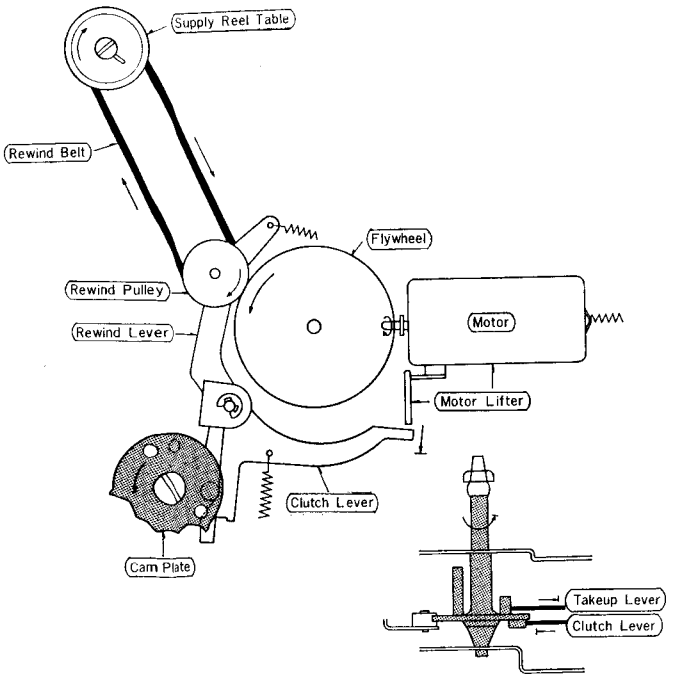


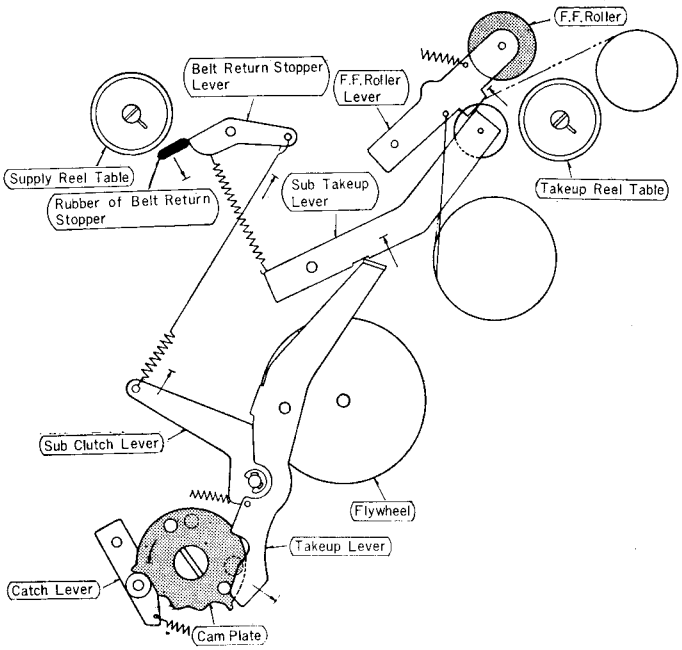


Push the F.F. Button, turn the operating Lever, and adjust the operator to Fast Forward condition. Then the following operations begin simultaneously for F.F. of tape.

1. Clutch Lever operates, power source is switched on, Motor Lifter is freed from suppression, Motor is pressed on Flywheel and motor rotation is transmitted to Flywheel.
2. Rotation transmitted to Flywheel turns Friction Pulley under Takeup Reel Table by Belt, the rotation is transmitted to F.F. Roller and its rotation to F.F. Pulley. As F.F. Pulley is fixed at Takeup Reel Table, the Reel Table quickly rotates.
3. Sub Clutch Lever operates, moves Belt Return Stopper Lever, and separates Rubber of Belt Return Stopper Lever from Supply Reel Table.
4. Catch Lever works and fixes operator.

REWIND

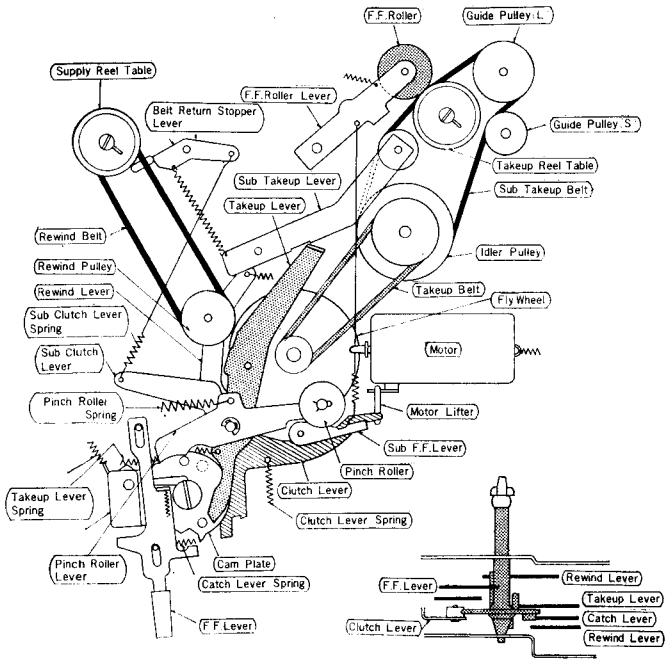




Turn the Operating Lever for putting the operator to rewinding condition. Then the following operations simultaneously occur, and the tape is quickly rewound.

1. Catch Lever operates, power source is switched on, Motor Lifter is freed from suppression, Motor is pressed on Flywheel, and Motor rotation is transmitted to Flywheel.
2. Rotation transmitted to Flywheel is further transmitted to Rewind Pulley which is pressed on Flywheel, and Supply Reel Table is turned to rewinding direction by Rewind Belt.
3. Takeup Lever operates, separates Sub Takeup Lever, F.F. Roller Lever and push F.F. Roller from Takeup Reel Teble, putting the Takeup Reel Table in freed condition.
4. Sub Clutch Lever operates, moves Belt Return Stopper Lever, and separates Rubber of Belt Return Stopper from Supply Reel Teble.
5. Catch Lever operates and fixes operator.

STOP



From the status of Record/Playback, quick feed or Rewinding, if the Operating Lever is turned and the operator is adjusted to stopping condition, the following movements occur simultaneously, power source is switched off, and operation come to a stop.

1. Clutch Lever works, power source is switched off, Motor Lifter is suppressed, and Motor is separated from Flywheel.
2. In case of stopping from Record/Playback, Rewind Lever works, circuit for Record/Playback is cut off, and Rewind Pulley is pressed on Flywheel.
   Pinch Roller Lever works, Pinch Roller is separated from Capstan Shaft, and the Pinch Roller Lever also actuate pad-up for separating pad from bed.
   By operation of Pinch Roller Lever, Sub F.F. Lever and F.F. Roller Lever are actuated to press F.F. Roller on Takeup Reel Teble which serves as a brake. Sub Clutch Lever and Belt Return Stopper Lever work to press Rubber of Belt Return Stopper of Supply Reel Table for braking.
3. In case of stopping from Fast Forward, Rewind Lever works, and Rewind Pulley is pressed on Flywheel. Sub Clutch Lever and Belt Return Stopper Lever work to press Rubber of Belt Return Stopper on Supply Reel Table for braking.
4. In case of stopping from rewinding, Takeup Lever and Sub Takeup Lever work to press F.F. Roller on Pulley of Takeup Reel Table.
   Braking is effected when F.F. Roller comes in touch with Pulley of Takeup Reel Table.

MECHANICAL ADJUSTMENTS

PINCH ROLLER TENSION

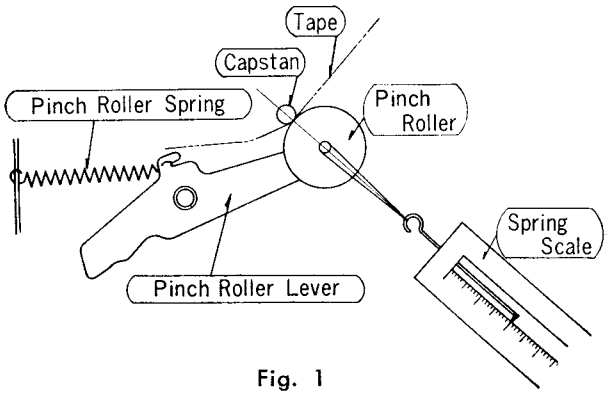


Fig. 1

Instruments Required: Spring Scale; Strong Twine.
Measurement: Refer to Fig. 1.

1. Load the tape as in the case of Playback, and set the Tape Recorder in Record or Playback mode.
2. Hang a loop of twine on the Pinch Roller Shaft and hook the Spring Scale on the other end of the loop.
3. Pull the Spring Scale in the direction of a line connecting the centers of the Capstan and Pinch Roller Shaft, and Pinch Roller Shaft, and increaring the pull slowly read the scale at a point where the tape stops moving by the pull.
4. The standard pressure of the Pinch Roller Shaft should be:
   1-7/8 ips.....5.3~7.4 ozs. (150~210 g)
   3-3/4 ips.....5.7~8.5 ozs. (160~240 g)

ADJUSTMENT

Adjust the Pinch Roller Spring to the standard pressure accordingly.

TAPE PAD PRESSURE

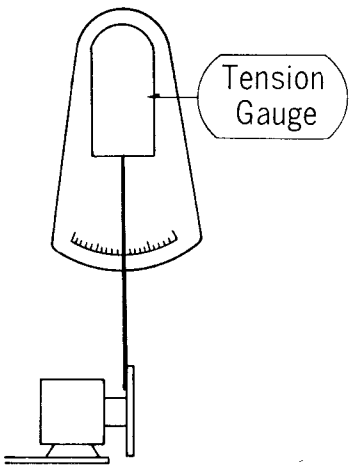


Fig. 2

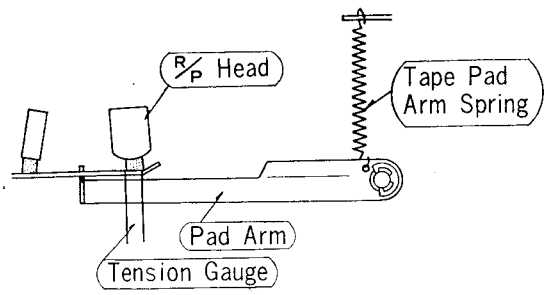


Fig. 3

Instrument Required: Tention Gauge
Measurement: Refer to Fig. 2. and 3.

1. Set the Tape Recorder in Playback mode without loading the tape.
2. Hook the Tension Gauge on the Tape Pad for the Record/Playback Head at the center and lightly pull the gauge so that the pad parts from the head. Take the reading just at the point where the pad parts from the head.
3. The standard pressure of the pad for the Record/Playback Head should be:
   0.2~0.5 ozs. (6~14 g)

ADJUSTMENT

Adjust the Tape Pad Arm Spring to the standard pressure.

WINDING TORQUE FOR PLAYBACK AND FAST FORWARD

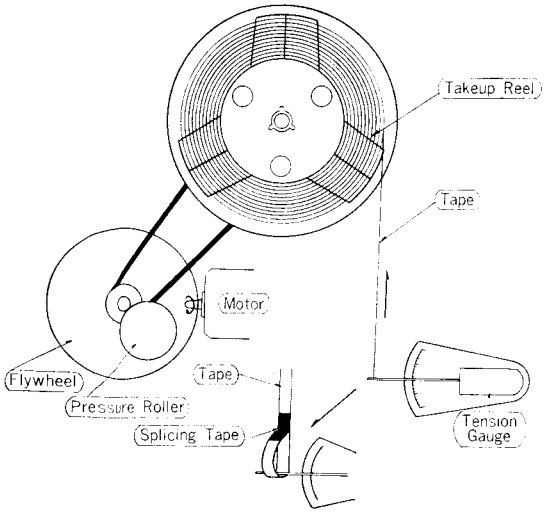


Fig. 4

Instruments Required: Tension Gauge; Splicing Tape
Measurement: Refer to Fig. 4.

1. Make a loop of the tape (5″ reel) end, fasten the looped end with the splicing tape, and put the reel on the Takeup Reel Table.
2. Hook the Tension Gauge on the loop and pull out 6 inches or so of the tape end.
3. Set in the Playback or Fast Forward mode, and pull the Tension Gauge in the direction of winding keeping the pace with the moving tape until the reading of the Tension Gauge remains constant at which point take the reading. Repeat this for several times and take the average for a correct torque.
4. The above test should be made with 5″ tape reel with full load.
5. The standard torque should be:
   Playback.....0.53~0.71 ozs. (15~20g)
   Fast Forward.....0.71 ozs. ~(20g~)

ADJUSTMENT

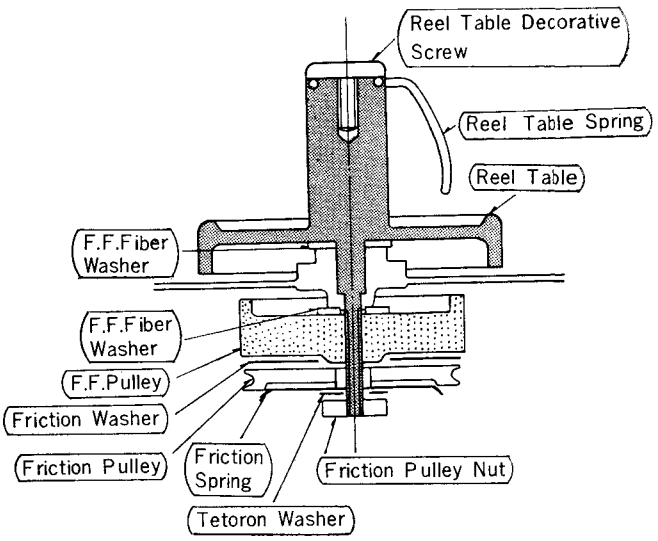


Fig. 5

Adjust the torque with the Friction Spring on the Takeup Reel Table. If the torque is too strong, loosen the Friction Spring, and if too weak tighten it. If the Friction Washer gets oily clean it immediately to prevent slip. If the tension of the Takeup Belt is weakened the winding torque drops.

BACK-TENSION FOR PLAYBCK

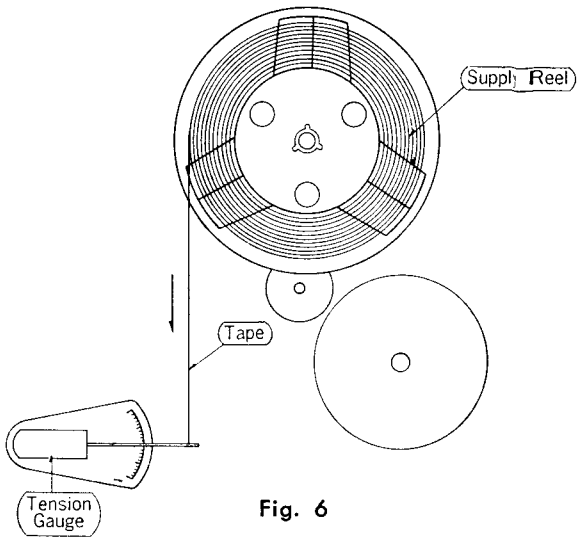


Fig. 6

Instruments Required: Tension Gauge; Splicing Tape
Measurement: Refer to Fig. 6.

1. Measure the back-tension in the manner similar to the winding torque for Playback, but in this case by pulling the tension gauge on the 5″ tape loaded on the Supply Reel Table.
2. Measure the back-tension for Playback with 5″ reel fully loaded.
3. The standard back-tension should be:
   0.05~0.25 ozs. (1.5~6.5 g)

ADJUSTMENT

Too strong back-tension may be caused by the accumulation of dust on the turning parts of the Rewind Pulley and Supply Reel Table, requiring occasional cleaning. Too weak back-tension may be due to the weakened tension of the Rewind Belt and it should preferably be replaced then.

MOTOR SHAFT PRESSURE AGAINST FLYWHEEL

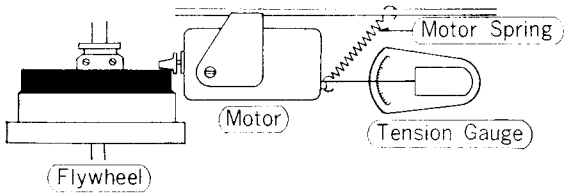


Fig. 7

Instrument Required: Tension Gauge
Measurement: Refer to Fig. 7.

1. Load the tape and set the Tape Recorder in Playback mode. Hook the Tension Gauge on the end of the Motor Spring attached to the Motor (see the drawing).
2. Pull the Tension Gauge opposite to the action of the spring and increase the pull until the Flywheel and the Motor Pulley part from each other at which point take the reading. The tape stops then.
3. The standard pressure for the Motor:
   2.5~3.5 ozs. (70~100 g)

ADJUSTMENT

Adjust the motor spring for correct pressure.

HEAD ADJUSTMENTS

Relative positions of heads and tape,
Adjust the relative positions of Record/Playback head and Erase head as shown in the drawing.

Improper relative positions of these heads causes imperfect erasure and cross-talk, and the slightest displacement of the mounting may lead to the lowe position of the head in respect of the tape. Close adjustment is therefore necessary.

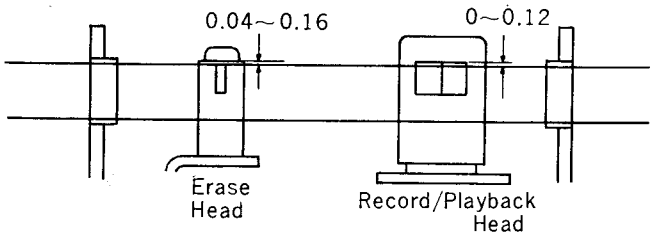


Fig. 8

Unit: Inch

HEAD AZIMUTH ADJUSTMENT

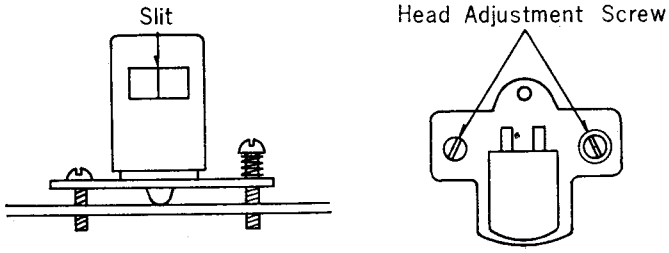


Fig. 9

Deflection of the angle of the head slit from vertical will deteriorate high frequency characteristic on playing back the tape with recording made with another Tape Recorder, while it is not so important with the tape recorded and played back on one and the same Tape Recorder. The higher the deflection, the poorer the poorer the perfomance.
To prevent this trouble, the slit of the head should be maintained precisely at right angles to the path of the tape.
Connect the Vacuum Tube Voltage Meter (V.T.V.M.) with 8 Ω Resistor in parallel to the Monitor Jack, and playback the standard alignment tape (tape with recording of signals, 3,000 cps. at 3-3/4 ips. on vertical slit).
Adjust the angle of the head slit to be precisely vertical by turning the adjusting screws so as to obtain the maximum output signal.
When the Record/Playback Head is replaced it must be adjusted as described above.

TREATMENT AFTER ADJUSTMENT

Lacquer-lock all the holding and adjustng screws of the heads after the adjustment has been completed.

AMPLIFIER ADJUSTMENTS

RECORD BIAS FREQUENCY

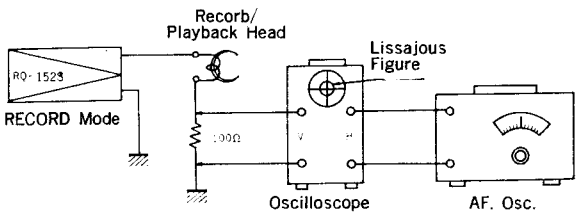


Fig. 10

Instruments Required: Oscilloscope; A.F. Oscillator; 100 Ω Resistor.
Measuring Circuit: Refer to Fig. 10.
Connect a 100 Ω Resistor in series to the ground side of the Record/Playback Head, and compare the frequency of voltage at both ends of the resistor with the frequency of the A.F. Oscillator.
To compare, make the oscilloscope form a Lissajou's Figure, and bringing the frequency of the A.F. Oscillator close to 50 kc, watch the point at which the circle of the Lissajou's Figure stands still which is the frequency to be measured. The standard frequency is: 30~40 kc.
If any frequency without the above range occurs, turn slowly the core of the Oscillator Transformer (T3) until the frequency remains within the range, tuning with the frequency of the A.F. Oscillator.

RECORD BIAS CURRENT

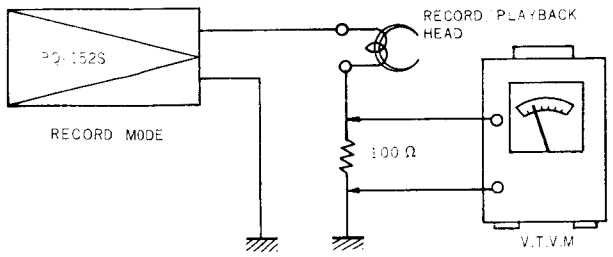


Fig. 11

Instruments Required: V.T.V.M.; 100 Ω Resistor
Measuring Circuit: Refer to Fig. 11.
After adjusting Record bias frequency, connect the V.T.V.M. to both ends of 100 Ω Resistor, and confirm if the Record bias current is 0.9~1.1 mA. Voltage at both ends of 100 Ω Resistor is 0.09~0.11 V.
If the Record bias current is without the above range, correct it by varying the Record bias frequency within the range of 25~35 kc.
When all the measurement is finished the original wiring on the heads should be restored. Care Should be taken to keep correct polarity so as to avoid distorsion noise.

ERASE CURRENT

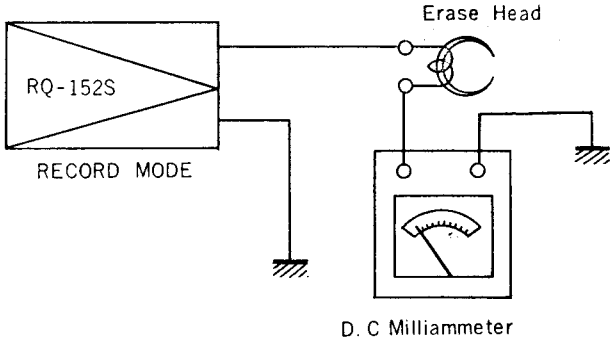


Fig. 12

Instruments Required: D.C. milliammeter
Measuring Circuit: Refer to Fig. 12.
Connect thh D.C. milliammeter in series to the ground side of the Erase head.
When the Tape Recorder is set in Record mode, D.C. milliammeter will indicate Erase current. The standard Erase current is between 4~8 mA.

RECORDING LEVEL

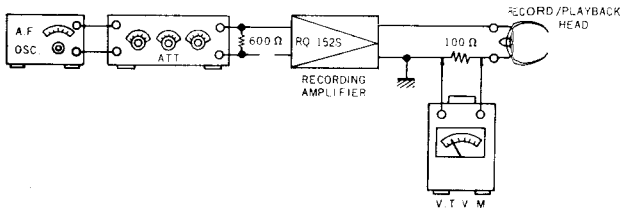
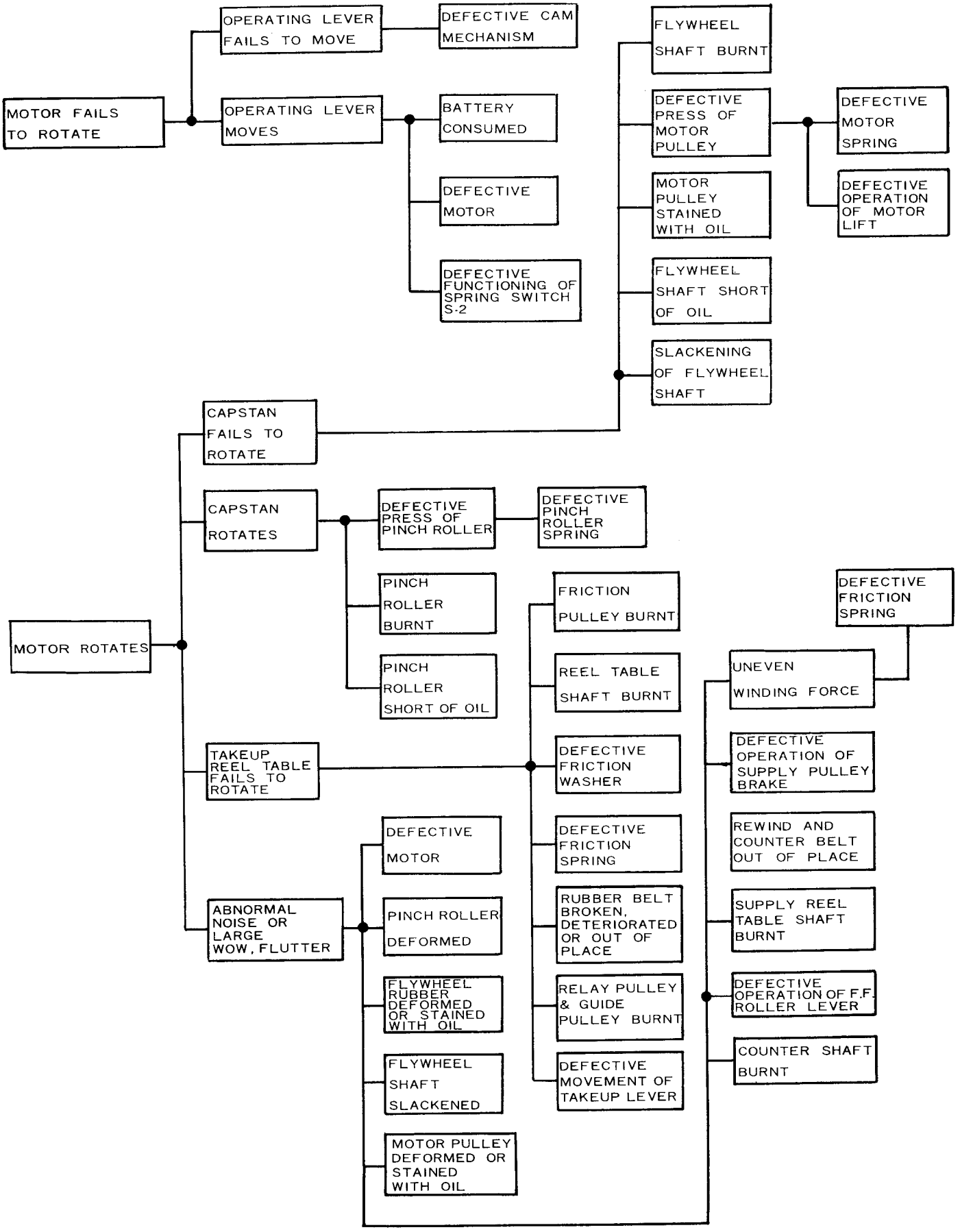


Fig. 13

Instruments Required: A.F. Oscillator; Attenuator; V.T.V.M.; 600 Ω and 100 Ω Resistors
Measuring Circuit: Refer to Fig. 13.
Remove the soldered lead wire from No. 3 of the Oscillator Transformer (T3) and stop the bias oscillation.
Set the Tape Recorder in Record mode and turn the volume control knob to the maximum.
Measure the recording level necessary to feed 0.05 mA to the Record-head from the input jack.
Connect a 100 Ω Resistor to the ground side of the Record head, and adjust the attenuator so that the voltage at both ends of the resistor is maintained at 0.05 V, and confirm if its value is −64.5~−74.5 db. Also confirm the indication of the V.U. meter which should be −3~+3 db.

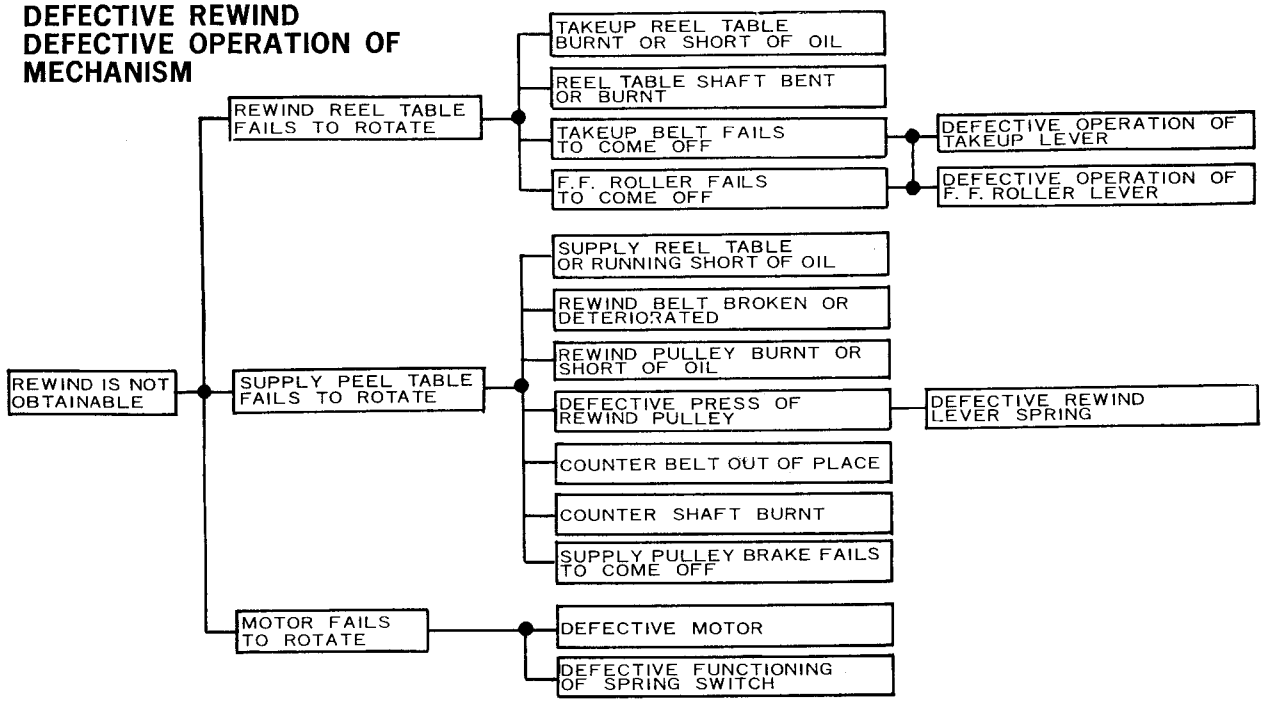
TROUBLE SHOOTING GUIDE 1.

DEFECTIVE RECORD/PLAYBACK
DEFECTIVE OPERATION OF MECHANISM

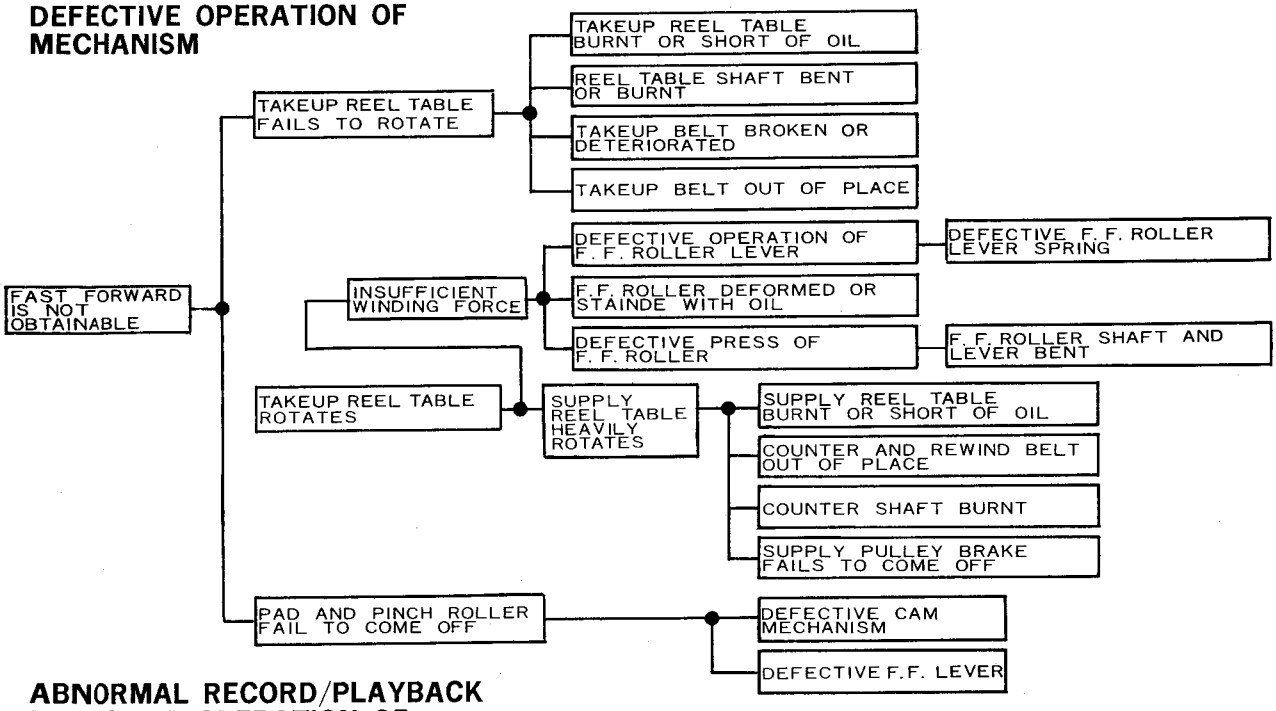

MOTOR FAILS TO ROTATE
OPERATING LEVER FAILS TO MOVE
DEFECTIVE CAM MECHANISM
OPERATING LEVER MOVES
BATTERY CONSUMED
DEFECTIVE MOTOR
DEFECTIVE FUNCTIONING OF SPRING SWITCH S-2
FLYWHEEL SHAFT BURNT
DEFECTIVE PRESS OF MOTOR PULLEY
DEFECTIVE MOTOR SPRING
DEFECTIVE OPERATION OF MOTOR LIFT
MOTOR PULLEY STAINED WITH OIL
FLYWHEEL SHAFT SHORT OF OIL
SLACKENING OF FLYWHEEL SHAFT
CAPSTAN FAILS TO ROTATE
MOTOR ROTATES
CAPSTAN ROTATES
DEFECTIVE PRESS OF PINCH ROLLER
DEFECTIVE PINCH ROLLER SPRING
PINCH ROLLER BURNT
PINCH ROLLER SHORT OF OIL
TAKEUP REEL TABLE FAILS TO ROTATE
ABNORMAL NOISE OR LARGE WOW, FLUTTER
DEFECTIVE MOTOR
PINCH ROLLER DEFORMED
FLYWHEEL RUBBER DEFORMED OR STAINED WITH OIL
FLYWHEEL SHAFT SLACKENED
MOTOR PULLEY DEFORMED OR STAINED WITH OIL
FRICTION PULLEY BURNT
REEL TABLE SHAFT BURNT
DEFECTIVE FRICTION WASHER
DEFECTIVE FRICTION SPRING
RUBBER BELT BROKEN, DETERIORATED OR OUT OF PLACE
RELAY PULLEY & GUIDE PULLEY BURNT
DEFECTIVE MOVEMENT OF TAKEUP LEVER
DEFECTIVE FRICTION SPRING
UNEVEN WINDING FORCE
DEFECTIVE OPERATION OF SUPPLY PULLEY BRAKE
REWIND AND COUNTER BELT OUT OF PLACE
SUPPLY REEL TABLE SHAFT BURNT
DEFECTIVE OPERATION OF F.F. ROLLER LEVER
COUNTER SHAFT BURNT

TROUBLE SHOOTING GUIDE 2.

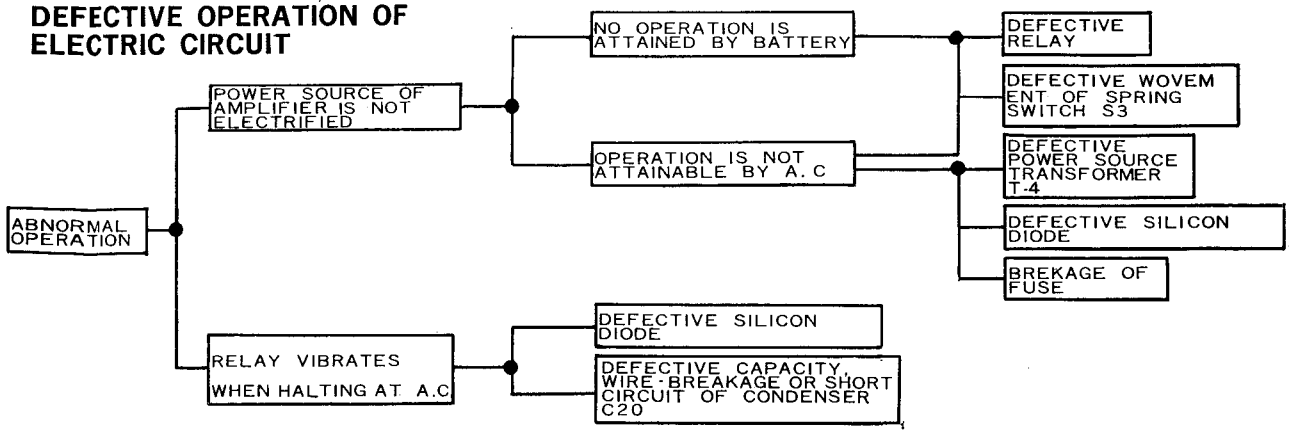
DEFECTIVE REWIND DEFECTIVE OPERATION OF MECHANISM


REWIND IS NOT OBTAINABLE
REWIND REEL TABLE FAILS TO ROTATE
TAKEUP REEL TABLE BURNT OR SHORT OF OIL
REEL TABLE SHAFT BENT OR BURNT
TAKEUP BELT FAILS TO COME OFF
DEFECTIVE OPERATION OF TAKEUP LEVER
F.F. ROLLER FAILS TO COME OFF
DEFECTIVE OPERATION OF F. F. ROLLER LEVER
SUPPLY PEEL TABLE FAILS TO ROTATE
SUPPLY REEL TABLE OR RUNNING SHORT OF OIL
REWIND BELT BROKEN OR DETERIORATED
REWIND PULLEY BURNT OR SHORT OF OIL
DEFECTIVE PRESS OF REWIND PULLEY
DEFECTIVE REWIND LEVER SPRING
COUNTER BELT OUT OF PLACE
COUNTER SHAFT BURNT
SUPPLY PULLEY BRAKE FAILS TO COME OFF
MOTOR FAILS TO ROTATE
DEFECTIVE MOTOR
DEFECTIVE FUNCTIONING OF SPRING SWITCH

DEFECTIVE FAST FORWARD DEFECTIVE OPERATION OF MECHANISM

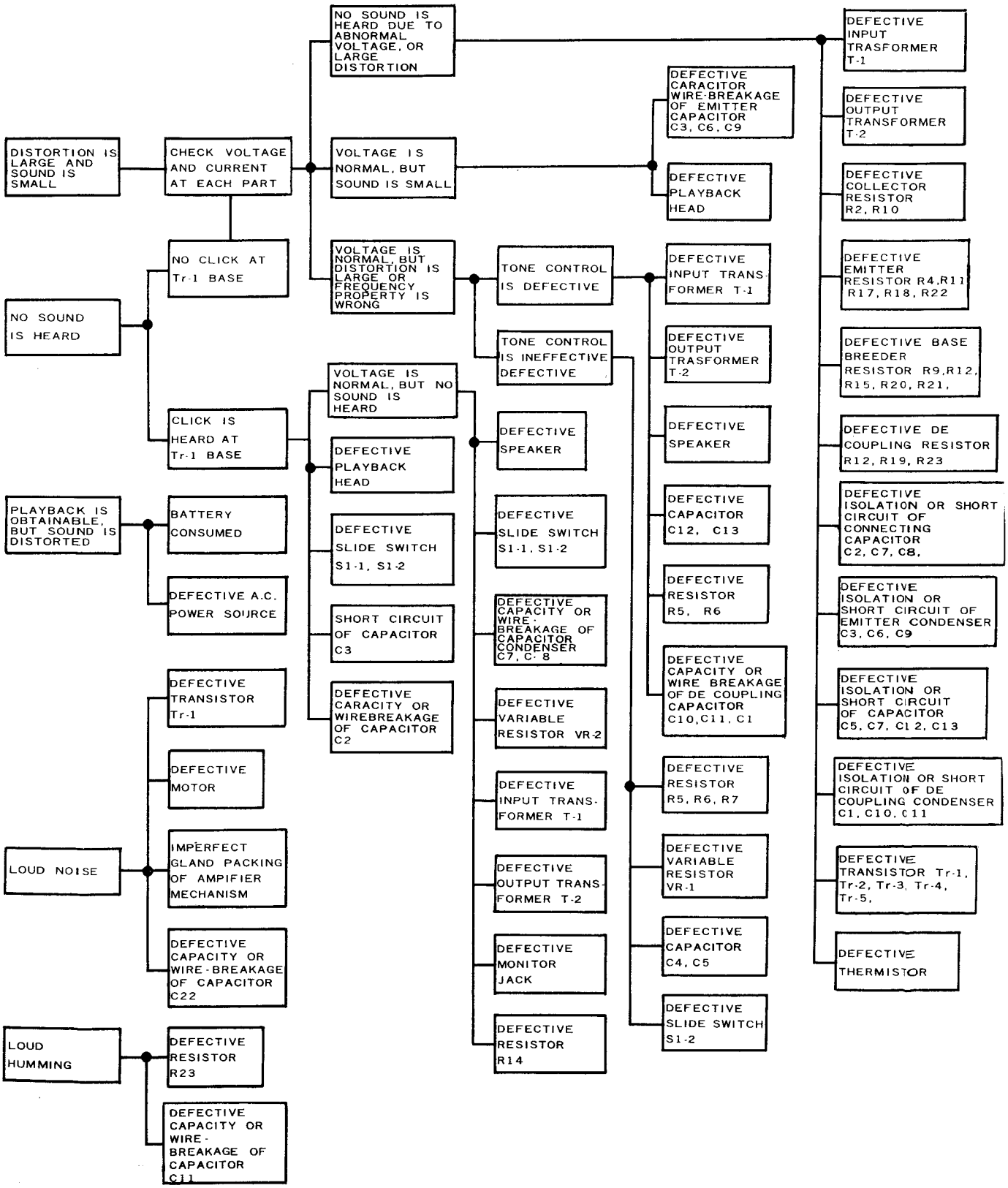

FAST FORWARD IS NOT OBTAINABLE
TAKEUP REEL TABLE FAILS TO ROTATE
TAKEUP REEL TABLE BURNT OR SHORT OF OIL
REEL TABLE SHAFT BENT OR BURNT
TAKEUP BELT BROKEN OR DETERIORATED
TAKEUP BELT OUT OF PLACE
INSUFFICIENT WINDING FORCE
DEFECTIVE OPERATION OF F. F. ROLLER LEVER
DEFECTIVE F.F. ROLLER LEVER SPRING
F.F. ROLLER DEFORMED OR STAINDE WITH OIL
DEFECTIVE PRESS OF F. F. ROLLER
F. F. ROLLER SHAFT AND LEVER BENT
TAKEUP REEL TABLE ROTATES
SUPPLY REEL TABLE HEAVILY ROTATES
SUPPLY REEL TABLE BURNT OR SHORT OF OIL
COUNTER AND REWIND BELT OUT OF PLACE
COUNTER SHAFT BURNT
SUPPLY PULLEY BRAKE FAILS TO COME OFF
PAD AND PINCH ROLLER FAIL TO COME OFF
DEFECTIVE CAM MECHANISM
DEFECTIVE F.F. LEVER

ABNORMAL RECORD/PLAYBACK DEFECTIVE OPERATION OF ELECTRIC CIRCUIT


ABNORMAL OPERATION
POWER SOURCE OF AMPLIFIER IS NOT ELECTRIFIED
NO OPERATION IS ATTAINED BY BATTERY
DEFECTIVE RELAY
DEFECTIVE WOVEM ENT OF SPRING SWITCH S3
OPERATION IS NOT ATTAINABLE BY A. C
DEFECTIVE POWER SOURCE TRANSFORMER T-4
DEFECTIVE SILICON DIODE
BREKAGE OF FUSE
RELAY VIBRATES WHEN HALTING AT A.C
DEFECTIVE SILICON DIODE
DEFECTIVE CAPACITY, WIRE-BREAKAGE OR SHORT CIRCUIT OF CONDENSER C20

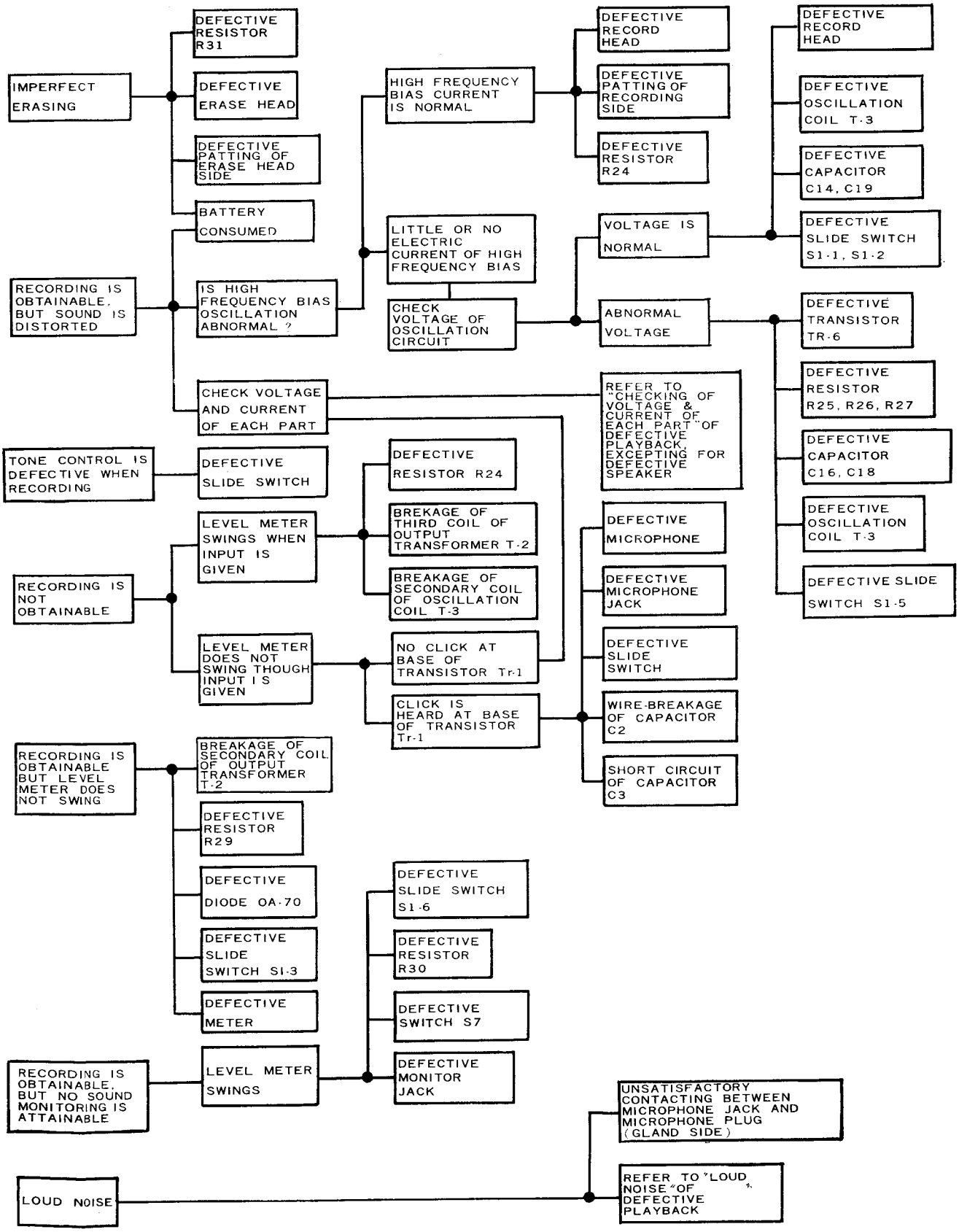
TROUBLE SHOOTING GUIDE 3.

ABNORMAL PLAYBACK
DEFECTIVE OPERATION OF ELECTRIC CIRCUIT


DISTORTION IS LARGE AND SOUND IS SMALL
CHECK VOLTAGE AND CURRENT AT EACH PART
NO SOUND IS HEARD
NO CLICK AT Tr-1 BASE
CLICK IS HEARD AT Tr-1 BASE
PLAYBACK IS OBTAINABLE, BUT SOUND IS DISTORTED
BATTERY CONSUMED
DEFECTIVE A.C. POWER SOURCE
LOUD NOISE
DEFECTIVE TRANSISTOR Tr-1
DEFECTIVE MOTOR
IMPERFECT GLAND PACKING OF AMPIFIER MECHANISM
DEFECTIVE CAPACITY OR WIRE-BREAKAGE OF CAPACITOR C22
LOUD HUMMING
DEFECTIVE RESISTOR R23
DEFECTIVE CAPACITY OR WIRE-BREAKAGE OF CAPACITOR C11
NO SOUND IS HEARD DUE TO ABNORMAL VOLTAGE, OR LARGE DISTORTION
VOLTAGE IS NORMAL, BUT SOUND IS SMALL
VOLTAGE IS NORMAL, BUT DISTORTION IS LARGE OR FREQUENCY PROPERTY IS WRONG
VOLTAGE IS NORMAL, BUT NO SOUND IS HEARD
DEFECTIVE PLAYBACK HEAD
DEFECTIVE SLIDE SWITCH S1-1, S1-2
SHORT CIRCUIT OF CAPACITOR C3
DEFECTIVE CARACITY OR WIREBREAKAGE OF CAPACITOR C2
DEFECTIVE CARACITOR WIRE-BREAKAGE OF EMITTER CAPACITOR C3, C6, C9
DEFECTIVE PLAYBACK HEAD
TONE CONTROL IS DEFECTIVE
TONE CONTROL IS INEFFECTIVE DEFECTIVE
DEFECTIVE SPEAKER
DEFECTIVE SLIDE SWITCH S1-1, S1-2
DEFECTIVE CAPACITY OR WIRE-BREAKAGE OF CAPACITOR CONDENSER C7, C-8
DEFECTIVE VARIABLE RESISTOR VR-2
DEFECTIVE INPUT TRANS-FORMER T-1
DEFECTIVE OUTPUT TRANS-FORMER T-2
DEFECTIVE MONITOR JACK
DEFECTIVE RESISTOR R14
DEFECTIVE INPUT TRANS-FORMER T-1
DEFECTIVE OUTPUT TRASFORMER T-2
DEFECTIVE SPEAKER
DEFECTIVE CAPACITOR C12, C13
DEFECTIVE RESISTOR R5, R6
DEFECTIVE CAPACITY OR WIRE BREAKAGE OF DE COUPLING CAPACITOR C10, C11, C1
DEFECTIVE RESISTOR R5, R6, R7
DEFECTIVE VARIABLE RESISTOR VR-1
DEFECTIVE CAPACITOR C4, C5
DEFECTIVE SLIDE SWITCH S1-2
DEFECTIVE INPUT TRASFORMER T-1
DEFECTIVE OUTPUT TRANSFORMER T-2
DEFECTIVE COLLECTOR RESISTOR R2, R10
DEFECTIVE EMITTER RESISTOR R4, R11 R17, R18, R22
DEFECTIVE BASE BREEDER RESISTOR R9, R12, R15, R20, R21,
DEFECTIVE DE COUPLING RESISTOR R12, R19, R23
DEFECTIVE ISOLATION OR SHORT CIRCUIT OF CONNECTING CAPACITOR C2, C7, C8,
DEFECTIVE ISOLATION OR SHORT CIRCUIT OF EMITTER CONDENSER C3, C6, C9
DEFECTIVE ISOLATION OR SHORT CIRCUIT OF CAPACITOR C5, C7, C12, C13
DEFECTIVE ISOLATION OR SHORT CIRCUIT OF DE COUPLING CONDENSER C1, C10, C11
DEFECTIVE TRANSISTOR Tr-1, Tr-2, Tr-3, Tr-4, Tr-5,
DEFECTIVE THERMISTOR

TROUBLE SHOOTING GUIDE 4.

ABNORMAL RECORD
DEFECTIVE OPERATION OF ELECTRIC CIRCUIT


IMPERFECT ERASING
DEFECTIVE RESISTOR R31
DEFECTIVE ERASE HEAD
DEFECTIVE PATTING OF ERASE HEAD SIDE
BATTERY CONSUMED
RECORDING IS OBTAINABLE, BUT SOUND IS DISTORTED
IS HIGH FREQUENCY BIAS OSCILLATION ABNORMAL ?
HIGH FREQUENCY BIAS CURRENT IS NORMAL
LITTLE OR NO ELECTRIC CURRENT OF HIGH FREQUENCY BIAS
CHECK VOLTAGE OF OSCILLATION CIRCUIT
DEFECTIVE RECORD HEAD
DEFECTIVE PATTING OF RECORDING SIDE
DEFECTIVE RESISTOR R24
VOLTAGE IS NORMAL
ABNORMAL VOLTAGE
DEFECTIVE RECORD HEAD
DEFECTIVE OSCILLATION COIL T-3
DEFECTIVE CAPACITOR C14, C19
DEFECTIVE SLIDE SWITCH S1-1, S1-2
DEFECTIVE TRANSISTOR TR-6
DEFECTIVE RESISTOR R25, R26, R27
DEFECTIVE CAPACITOR C16, C18
DEFECTIVE OSCILLATION COIL T-3
DEFECTIVE SLIDE SWITCH S1-5
CHECK VOLTAGE AND CURRENT OF EACH PART
REFER TO "CHECKING OF VOLTAGE & CURRENT OF EACH PART" OF DEFECTIVE PLAYBACK, EXCEPTING FOR DEFECTIVE SPEAKER
TONE CONTROL IS DEFECTIVE WHEN RECORDING
DEFECTIVE SLIDE SWITCH
RECORDING IS NOT OBTAINABLE
LEVEL METER SWINGS WHEN INPUT IS GIVEN
DEFECTIVE RESISTOR R24
BREKAGE OF THIRD COIL OF OUTPUT TRANSFORMER T-2
BREAKAGE OF SECONDARY COIL OF OSCILLATION COIL T-3
LEVEL METER DOES NOT SWING THOUGH INPUT I S GIVEN
NO CLICK AT BASE OF TRANSISTOR Tr-1
CLICK IS HEARD AT BASE OF TRANSISTOR Tr-1
DEFECTIVE MICROPHONE
DEFECTIVE MICROPHONE JACK
DEFECTIVE SLIDE SWITCH
WIRE-BREAKAGE OF CAPACITOR C2
SHORT CIRCUIT OF CAPACITOR C3
RECORDING IS OBTAINABLE BUT LEVEL METER DOES NOT SWING
BREAKAGE OF SECONDARY COIL OF OUTPUT TRANSFORMER T-2
DEFECTIVE RESISTOR R29
DEFECTIVE DIODE OA-70
DEFECTIVE SLIDE SWITCH S1-3
DEFECTIVE METER
RECORDING IS OBTAINABLE, BUT NO SOUND MONITORING IS ATTAINABLE
LEVEL METER SWINGS
DEFECTIVE SLIDE SWITCH S1-6
DEFECTIVE RESISTOR R30
DEFECTIVE SWITCH S7
DEFECTIVE MONITOR JACK
UNSATISFACTORY CONTACTING BETWEEN MICROPHONE JACK AND MICROPHONE PLUG (GLAND SIDE)
LOUD NOISE
REFER TO "LOUD NOISE" OF DEFECTIVE PLAYBACK

REPLACEMENT PARTS LIST

ATTENTION: Please order Replacement Parts according to this Replacement Parts List. The parts which are not listed up here will not be supplied. So a part in an assembly has to be ordered as a whole assembly.

RESISTORS

Ref. No.	Description	Parts No.
R 1	Carbon Resistor 22 KΩ 1/4 Watt 10%	QRD-14TRK223
R 2	Carbon Resistor 10 KΩ 1/4 Watt 10%	QRD-14TRK103
R 3	Carbon Resistor 120 Ω 1/4 Watt 10%	QRD-14TRK121
R 4	Carbon Resistor 1.2 KΩ 1/4 Watt 10%	QRD-14TRK122
R 5	Carbon Resistor 2.2 KΩ 1/4 Watt 10%	QRD-14TRK222
R 6	Carbon Resistor 1.2 KΩ 1/4 Watt 10%	QRD-14TRK122
R 7	Carbon Resistor 270 Ω 1/4 Watt 10%	QRD-14TRK271
R 8	Carbon Resistor 33K Ω 1/4 Watt 10%	QRD-14TRK333
R 9	Carbon Resistor 100 KΩ 1/4 Watt 10%	QRD-14TRK104
R 10	Carbon Resistor 2.7 KΩ 1/4 Watt 10%	QRD-14TRK272
R 11	Carbon Resistor 2.2 KΩ 1/4 Watt 10%	QRD-14TRK222
R 12	Carbon Resistor 1.2 KΩ 1/4 Watt 10%	QRD-14TRK122
R 13	Carbon Resistor 33 KΩ 1/4 Watt 10%	QRD-14TRK333
R 14	Carbon Resistor 560 Ω 1/4 Watt 10%	QRD-14TRK561
R 15	Carbon Resistor 10 KΩ 1/4 Watt 10%	QRD-14TRK103
R 16	Carbon Resistor 820 Ω 1/4 Watt 10%	QRD-14TRK821
R 17	Carbon Resistor 330 Ω 1/4 Watt 10%	QRD-14TRK331
R 18	Carbon Resistor 10 Ω 1/4 Watt 10%	QRD-14TRK100
R 19	Carbon Resistor 270 Ω 1/4 Watt 10%	QRD-14TRK271
R 20	Carbon Resistor 1.5 KΩ 1/4 Watt 10%	QRD-14TRK152
R 21	Carbon Resistor 100 Ω 1/4 Watt 10%	QRD-14TRK101
R 22	Carbon Resistor 2.2 Ω 1/4 Watt 10%	QRD-14TRK222
R 23	Carbon Resistor 47 Ω 1/4 Watt 10%	QRD-14TRK470
R 24	Carbon Resistor 100 KΩ 1/4 Watt 10%	QRD-14TRK104
R 25	Carbon Resistor 4.7 Ω 1/4 Watt 10%	QRD-14TRK4R7
R 26	Carbon Resistor 10 KΩ 1/4 Watt 10%	QRD-14TRK103
R 27	Carbon Resistor 47 KΩ 1/4 Watt 10%	QRD-14TRK473
R 28	Carbon Resistor 25 KΩ 1/4 Watt 5%	QRD-14TRJ253
R 29	Carbon Resistor 270 Ω 1/4 Watt 10%	QRD-14TRK271
R 30	Carbon Resistor 10 Ω 1/2 Watt 10%	QRD-12TRK100
R 31	Carbon Resistor 560 Ω 1/4 Watt 10%	QRD-14TRK561
R 32	Carbon Resistor 270 Ω 1/4 Watt 10%	QRD-14TRK271
R 33	Carbon Resistor 100 KΩ 1/4 Watt 10%	QRD-14TRK104

CAPACITORS

C 1	Electrolytic Capacitor 50 μF WV 10V	QCE-A10V50
C 2	Electrolytic Capacitor 1 μF WV 10V	QCE-A10V1
C 3	Electrolytic Capacitor 30 μF WV 6V	QCE-A6V30
C 4	Polystyrene Capacitor 0.1 μF	QCQ-K05104M
C 5	Polystyrene Capacitor 0.05 μF	QCQ-K05503M
C 6	Electrolytic Capacitor 30 μF WV 6V	QCE-A6V30
C 7	Electrolytic Capacitor 10 μF WV 10V	QCE-A10V10
C 8	Electrolytic Capacitor 0.5 μF WV 10V	QCE-A10V0R5
C 9	Electrolytic Capacitor 50 μF WV 6V	QCE-A6V50
C 10	Electrolytic Capacitor 50 μF WV 10V	QCE-A10V50
C 11	Electrolytic Capacitor 500 μF WV 12V	QCE-A12V500
C 12	Polystyrene Capacitor 0.01 μF	QCQ-K05103M

Ref. No.	Description	Parts No.
C 13	Polystyrene Capacitor 0.01 μF	QCQ-K05103M
C 14	Polystyrene Capacitor 0.001 μF	QCQ-K05102M
C 15	Electrolytic Capacitor 500 μF WV 12V	QCE-A12V500
C 16	Electrolytic Capacitor 3 μF WV 12V	QCE-A12V3
C 18	Polystyrene Capacitor 0.01 μF	QCQ-K05103M
C 19	Polystyrene Capacitor 3900 PF	QCQ-K05392M
C 21	Polystyrene Capacitor 820 PF	QCQ-K05821M
C 22	Electrolytic Capacitor 100 μF WV 10V	QCE-A10V100

TRANSISTORS

Ref. No.	Description	Parts No.
Tr 1	Transistor	2SB 173
Tr 2	Transistor	2SB 175
Tr 3	Transistor	2SB 175
Tr 4	Transistor	2SB 178
Tr 5	Transistor	2SB 178
Tr 6	Transistor	2SB 172

VARIABLE RESISTORS

VR 1	Variable Resistor 10 KΩ	QVVR-600A10KC
VR 2	Variable Resistor 10 KΩ	QVVR-1606G10KC

DIODES

D 1	Silicon Diode	FR-1A
D 2	Silicon Diode	FR-1A
D 3	Diode	OA-70

TRANSFORMERS

T 1	Input Transformer	QLA-0113
T 2	Output Transformer	QLA-0322
T 3	Oscillator Transformer	QLB-0119
T 4	Power Transformer	QLP-0365

SWITCHES

S 1	Record/Playback selector Switch	ESD-0162
S 2	Power ON/OFF Switch	QSB-0132
S 3	Stop Switch	QSB-0132
S 4	Relay	QSK-0104
S 5	Rewind Switch	QSB-0141
S 6	Rewind Switch	QSB-0141
S 7	Sound Monitor Switch	
S 8	Voltage Selector Switch	QSS-1011

THERMISTORS

SM	Thermistor TD6-A050	QVM-500A

ELECTRICAL PARTS

E 1	Record/Playback Head	WY-011
E 2	Erase Head	WY-209
E 3	Speaker	EAS-9P52S
E 4	Speaker Holder	QKT-1154
E 5	Base Plate Supporter	QLT-1153
E 6	V.U. Meter	QSL-0024
E 7	A. C. Power Cord (with 2 Pin Plug)	QFC-1021
E 8	A. C. Power Cord Bushing	QTD-1126
E 9	Insulating Paper	QBK-1039
E 10	Circuit Board Assembly	QEI-0083
E 11	Mic. & Remote Jack	QJA-0214
E 12	M-3 Jack	QJA-0110
E 13	R/P Selector Switch Spring (long)	QBT-1136
E 14	R/P Selector Switch Spring (Short)	QBT-1137
E 15	Lug A3	QMQ-1018
E 16	Screw, Round Head M2.6φ×3	QHM-226×5N3
E 17	Fuse	QJF-1001
E 18	Fuse Holder	QTF-1009
E 19	Voltage Selector Switch Angle	QTT-1222

MECHANICAL PARTS

M 1	Reel Table Screw	QHQ-1048
M 2	Reel Table Spring	QBS-1016
M 3	Reel Table Washer	QBJ-3025
M 4	Reel Table Assembly	QXP-0117
M 5	Paper Washer 4×8×0.5	QBK-7048
M 6	Screw, Round Head M2 φ×6	QHM-120×6U3
M 7	Screw, Round Head M2 φ×10	QHM-120×10U3
M 8	Flat Washer W2 φ	QWP-2022U3
M 9	Head Adjustment Spring	QBC-1026
M 10	Screw, Round Head M3 φ×5	QHM-230×5U3
M 11	Capstan Holding Screw	QHQ-1032
M 12	Capstan Sleeve	QMS-1090
M 13	Paper Washer 5×8×0.25	QBK-7053
M 14	Stop Ring E4 φ	QNS-404U3
M 15	Flywheel Shaft Metal	QMM-1048
M 16	Pinch Roller Spring	QMN-1050
M 17	Plastic Washer 4×7×0.15	QBJ-3009
M 18	Oil Seal	QBJ-1059
M 19	Pinch Roller	QDP-1053
M 20	Paper Washer 4×7×0.5	QBK-7045
M 21	Stop Ring E3 φ	QNS-304U3
M 22	Pinch Roller Rubber Bushing	QBG-1077
M 23	Pad Arm	QAP-1084
M 23 1	Pad Felt	QAP-1054
M 24	Pad Arm Spring	QAP-1056
M 25	Base Plate Rubber Bushing	QBG-1078
M 26	Tape Counter	QDC-0010
M 26-1	Tape Counter Pulley	QDP-1089
M 27	Counter Spacer	QTW-1028
M 28	Tape Counter Belt	QDB-0047

Ref. No.	Description	Parts No.
M 29	Rubber Cushion for V.U. Meter	QBG-1079
M 30	Screw, Round Head M3$\phi\times$8	QHM-230$\times$8U3
M 31	Cam	QMQ-1044
M 32	Lock washer L3 ϕ	QWG-302K3
M 33	Fast Forward Roller Lever Spring	QBT-1130
M 34	Fast Forward Roller	QDP-1090
M 35	Pulley Lock Spring	QBT-1132
M 36	Sub Fast Forward Lever Spring	QBT-1131
M 37	Paper Washer 3.7$\times$7$\times$0.25	QBK-7036
M 38	Guide Pulley (L)	QDP-1054
M 39	Guide Pulley (S)	QDP-1051
M 40	Fast Forward Pulley	QDP-1091
M 41	Friction Washer	QWQ-1045
M 42	Friction Pulley	QDP--1094
M 43	Friction Spring	QBP-1029
M 44	Plastic Washer 6$\times$8$\times$0.15	QBJ-3006
M 45	Friction Pulley Nut	QNQ-1020
M 46	Paper Washer 5$\times$8$\times$0.25	QBK-7053
M 47	Idler Pulley	QDP-1092
M 48	Paper Washer 5.2$\times$8$\times$0.5	QBK-7065
M 49	Sub Takeup Belt	QDB-0048
M 50	Takeup Belt	QDB-0049
M 51	Supply Pulley Brake Arm	QXL-0064
M 52	Sub Clutch Lever Spring	QBT-1143
M 53	Supply Pulley Brake Arm Spring	QBT-1133
M 54	Supply Pulley	QDP-1093
M 55	Hexagonal Nut N3 ϕ	QNN-3022U3
M 56	Motor Assembly	QYQ-0032
M 57	Motor Spring	QBT-1139
M 58	Flywheel	QXF-0025
M 59	Flywheel Thrust Steel Ball	QDK-1002
M 60	Screw, Round Head M3 $\phi\times$4	QHM-130$\times$4U3
M 61	Flywheel Spacer	QNK-1063
M 62	Thrust Steel Ball Retainer	QMQ-1035
M 63	Pinch Roller Lever Spring	QBT-1125
M 64	Clutch Lever Spring	QBT-1064
M 65	Rewind Lever	QXL-0062
M 66	Plastic Washer 4$\times$7$\times$0.15	QBJ-3009
M 67	Rewind Pulley	QDP-1052
M 68	Steel Washer 4$\times$12$\times$0.3	QWQ-1051
M 69	Rewind Rubber Belt	QDB-0025
M 70	Rewind Lever Spring	QBT-1072
M 71	Motor Lifter	QBK-1042
M 72	Cam Plate	QMF-1051
M 73	Record Lock Spring	QBT-1066-1
M 74	Catch Lever	QXL-0024
M 75	Catch Lever Spring	QBT-1134
M 76	Paper Washer 4$\times$8$\times$1.5	QBK-7052
M 77	Fast Forward Lever	QML-1205

CABINET PARTS

G 1	Top Cover Case Assembly	QYA-0040
G 1-1	Top Cover Lock Button	QGO-3008
G 1-2	Top Cover Lock Spring	QBP-1059
G 1-3	Screw, Round Head M2 $\phi\times$3	QHM-220$\times$3U3
G 2	Head Cover	QYR-0049
G 3	Main Case Assembly	QYB-0085
G 3-1	Record Lock Button	QGO-1025
G 3-2	Record Lock Spring	QBC-1042
G 3-3	Record Lock Lever	QML-1219
G 3-4	Belt Catch	QHQ-1049
G 3-5	Plastic Washer 4.2$\times$8.5$\times$0.2	QBJ-3022
G 3-6	Lock Washer L4 ϕ	QWG-402K3
G 3-7	Hexagonal Nut N4 ϕ	QNN-4022U3
G 3-8	Screw, Round Head MS3$\phi\times$10	QHV-230$\times$10V3
G 3-9	Side Panel	QYP-0056
G 3-10	Hexagonal Nut N3 ϕ	QNN-3022U3
G 3-11	Capstan Rest	QMP-1036
G 3-12	Head Cover Pin	QMN-1090
G 3-13	Hexagonal Nut N2.6 ϕ	QNN-2622U3
G 3-14	Pole	QMP-1078
G 4	Bottom Cover Case Assembly	QYC-0046
G 4-1	Battery Pulling Belt	QFQ-1005
G 4-2	Flat Washer W3 ϕ	QWP-302N3
G 4-3	Tapping Screw M3$\phi\times$6	QHM-530$\times$6U3
G 5	Battery Compartment Cover Assembly	QEO-0006
G 6	A.C. Power Cord Compartment Cover Assembly	QYF-0023
G 7	Hinge	QKC-1013
G 8	Screw, Round Head T2.6 $\phi\times$10	QHT-226$\times$10V3
G 9	Rubber Washer	QBG-1076
G 10	Base Plate Holding Screw (long)	QHQ-1054
G 11	Base Plate Holding Screw (short)	QHQ-1052
G 12	Base Plate Pole (long)	QHQ-1050
G 13	Base Plate Pole (Short)	QHQ-1051
G 14	Flat Washer W3.5 ϕ	QWP-3512N1
G 15	Paper Washer 3.1$\times$9.1$\times$0.5	QBK-7039
G 16	Screw, Round Head M3 $\phi\times$5	QHM-230$\times$5U3
G 17	Knob Holding Screw	QHQ-1055
G 18	Lock Washer L4ϕ	QWG-352K3
G 19	Operator Knob	QGT-2025
G 20	Fast Forward Button	QGO-1024
G 21	Volume Control Knob	QGT-1046
G 22	Tone Control Knob	QGT-1047
G 23	Jack Conceal Plate	QGJ-1053

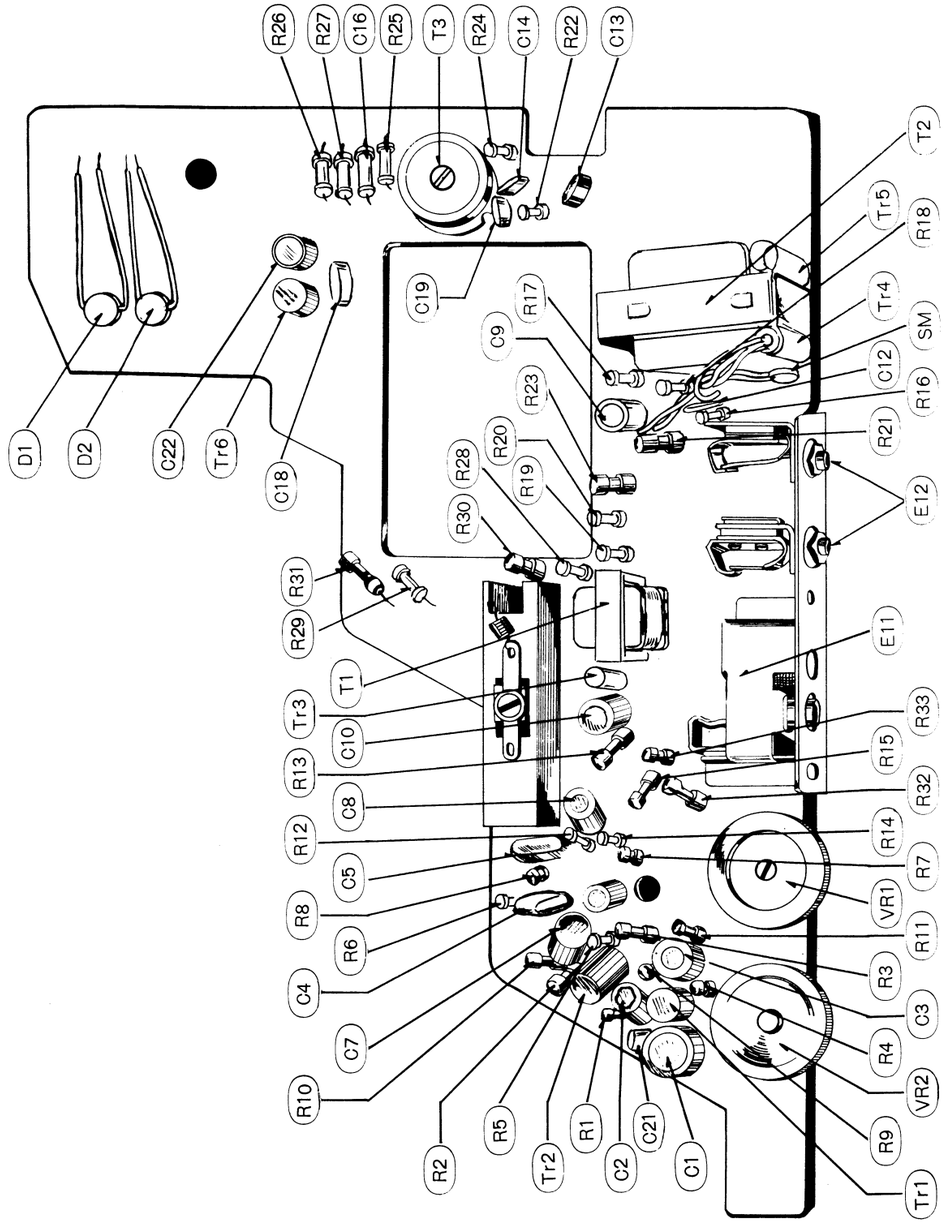
ACCESSORIES

A 1	Dynamic Microphone	WM-2050N
A 2	Accessory Bag	QFK-0010
A 3	Magnetic Earphone	
A 4	2 Pin Plug B	QJP-0910
A 5	Connection Cord-R	QEB-0017
A 6	Hand Belt	QKH-1026
A 7	5″ Recording Tape	QFT-5NZ-1
A 8	5″ Empty Reel	QFR-5NZ-1
A 9	Splicing Tape	QFS-0002-1
A 10	Instruction Book	QQT-0178

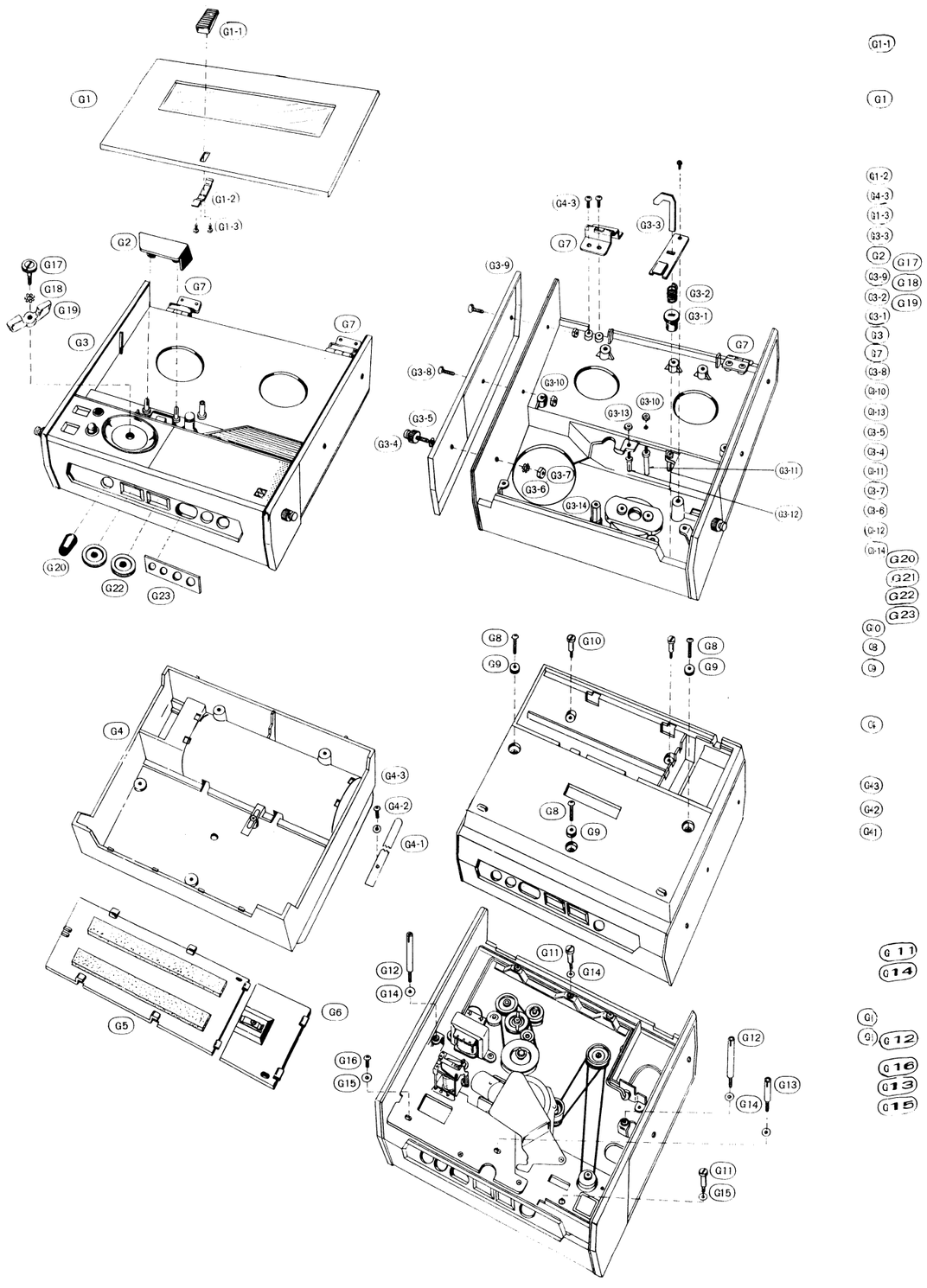
PACKING

P 1	Packing Case	QPN-1279
P 2	Inner Cushion (L)	QBJ-1126
P 3	Inner Cushion (R)	QBJ-1127
P 4	Dust Cover	QFD-0056
P 5	Accessory Case	QPW-1046

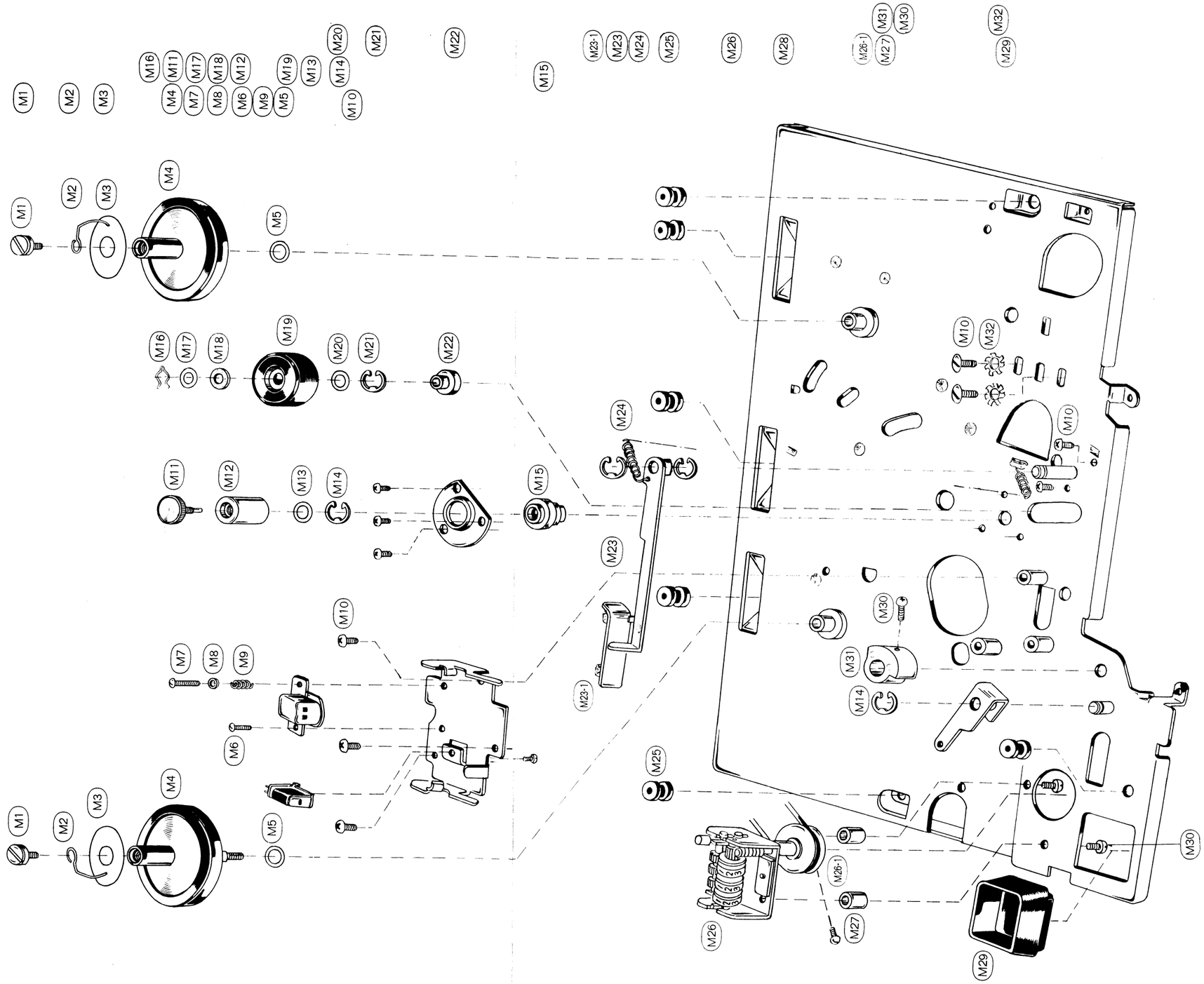
CIRCUIT BOARD



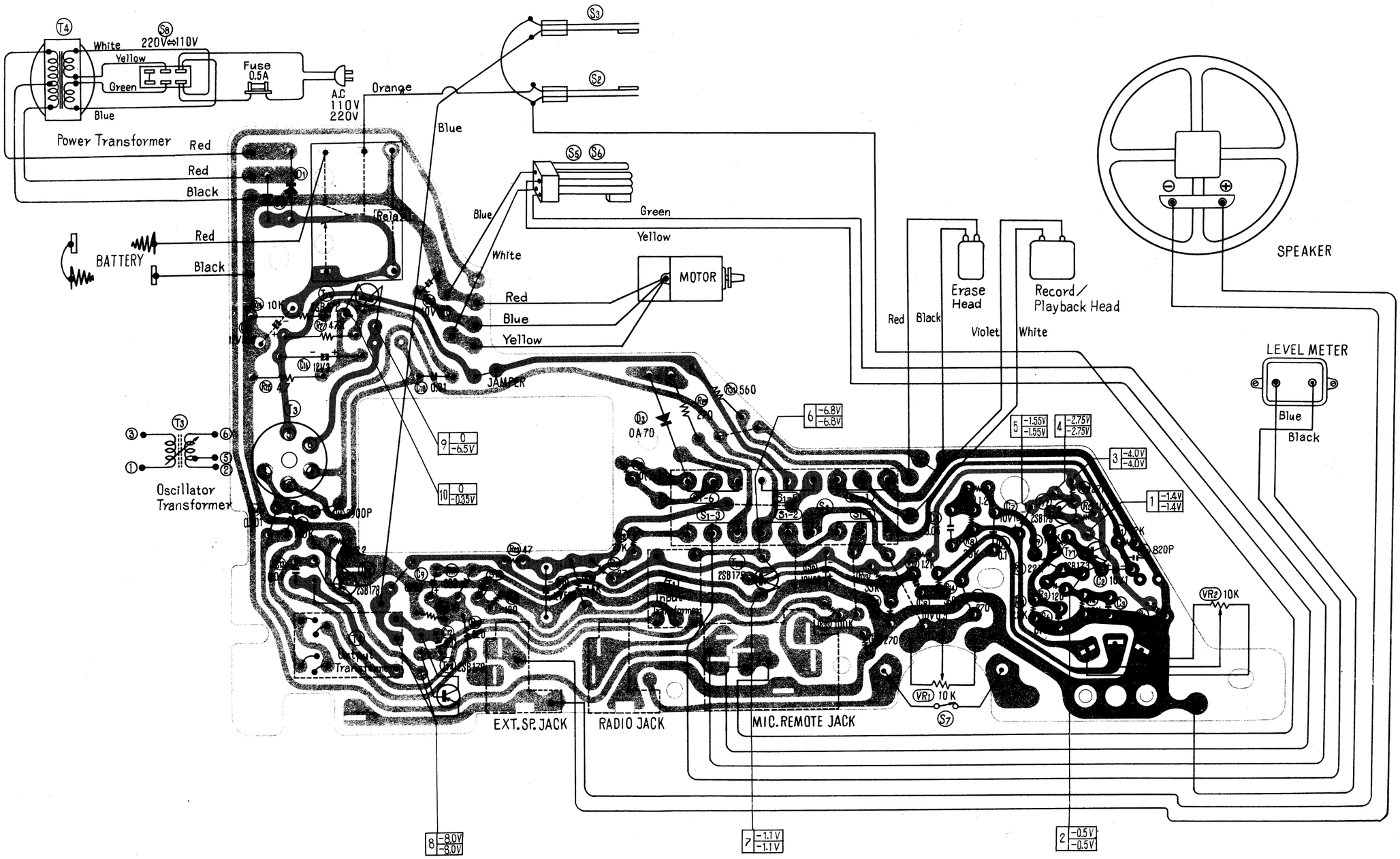
CABINET PARTS



EXPLODED VIEWS

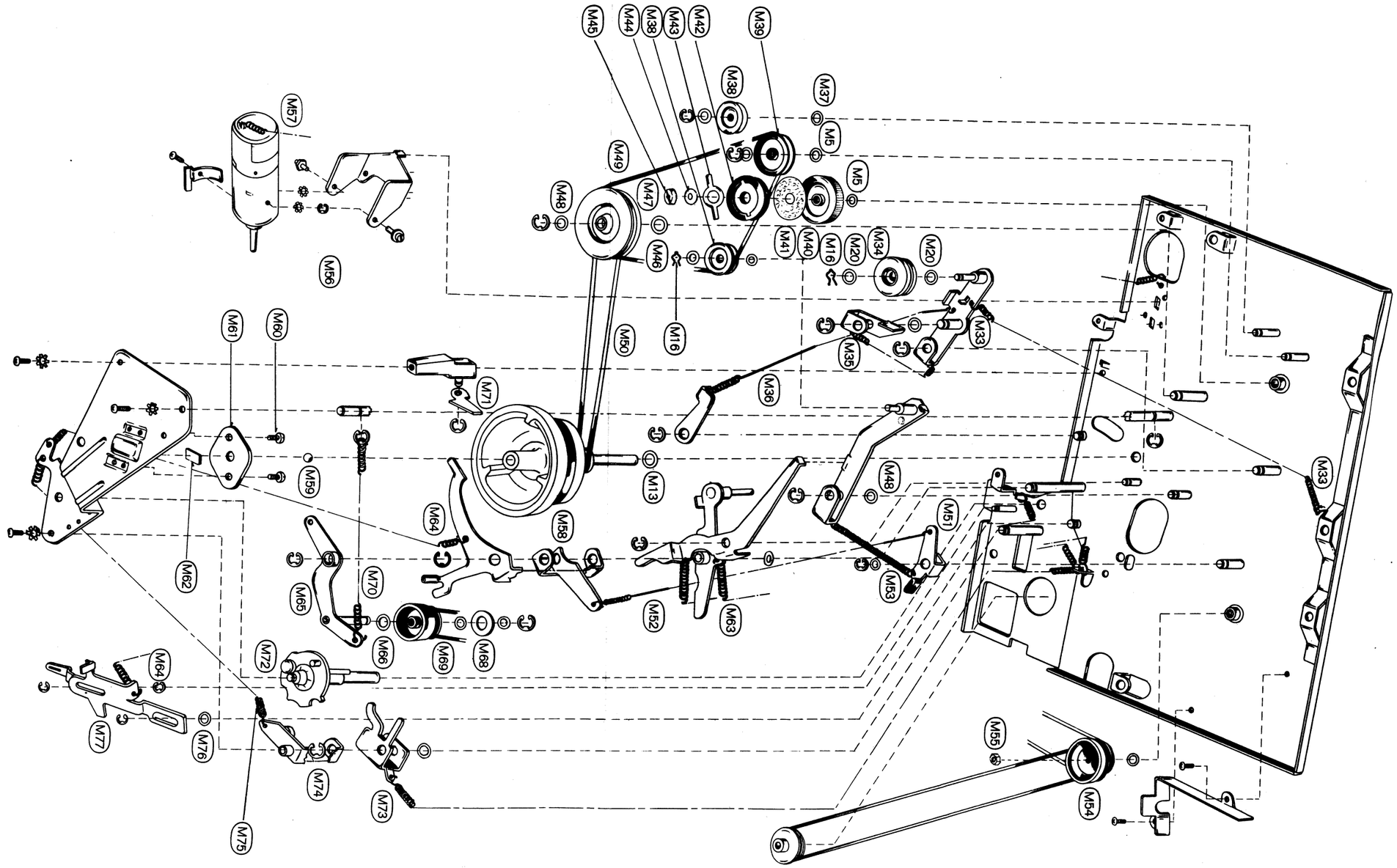


WIRING CONNECTION DIAGRAM MODEL RQ-152S



NOTE:

Values indicated in ▭ are D.C to chassis ground with on signal applied.
The upper values should be measured during playback and the lower values during recording.
The Circuit shown in red on the Conductor side is B Circuit.



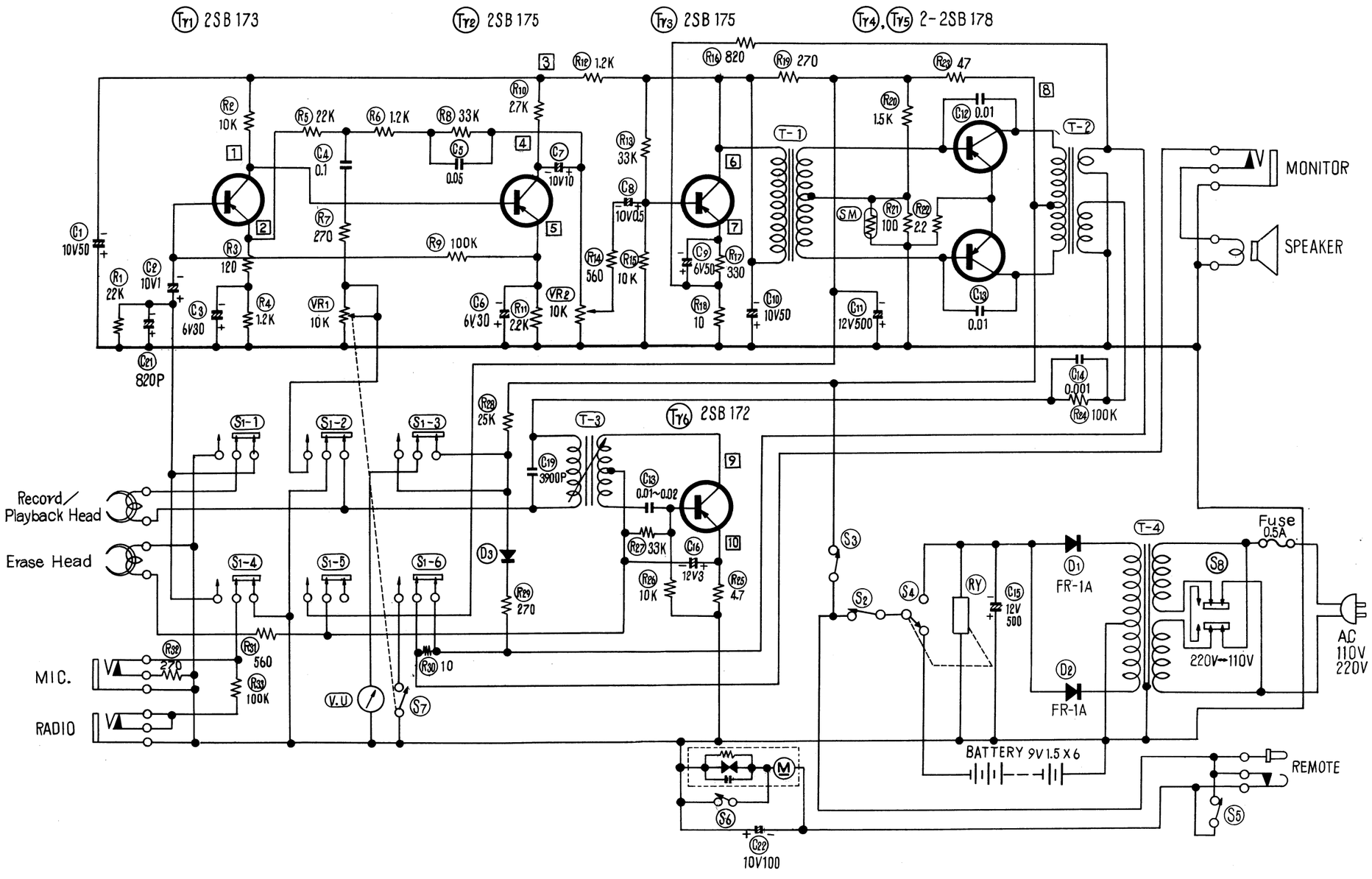
M13 M16 M5 M20

M45 M49 M44 M47 M46 M43 M42 M38 M39 M36 M41 M40 M37 M35 M34 M48 M33

M77 M64 M76 M75 M72 M60 M57 M65 M74 M59 M56 M70 M66 M73 M69 M71 M68 M58 M50 M52 M63 M53 M51 M55 M54

M62 M61

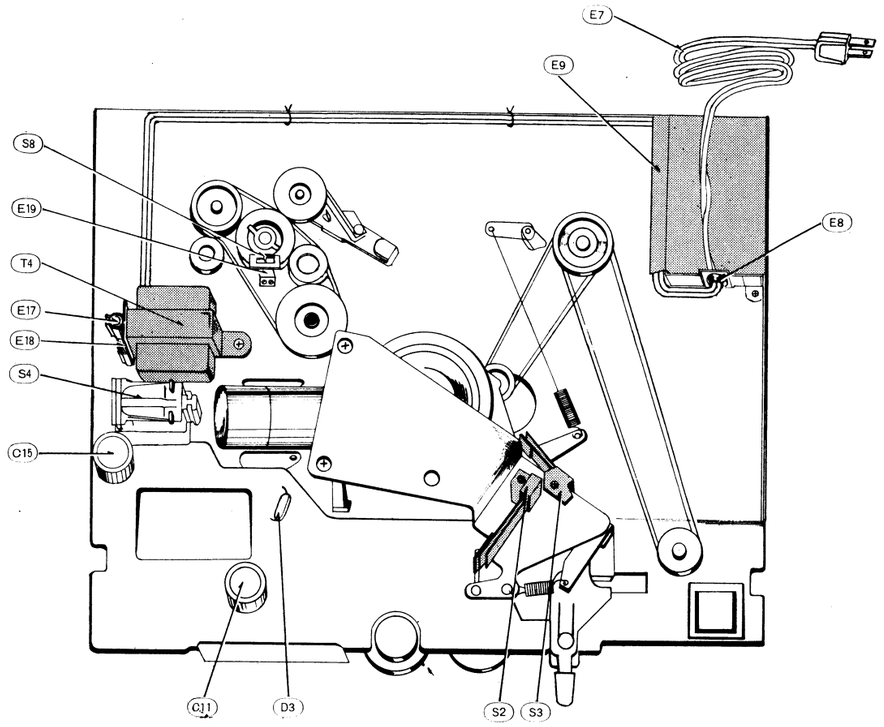
SCHEMATIC CIRCUIT DIAGRAM MODEL RQ-152S

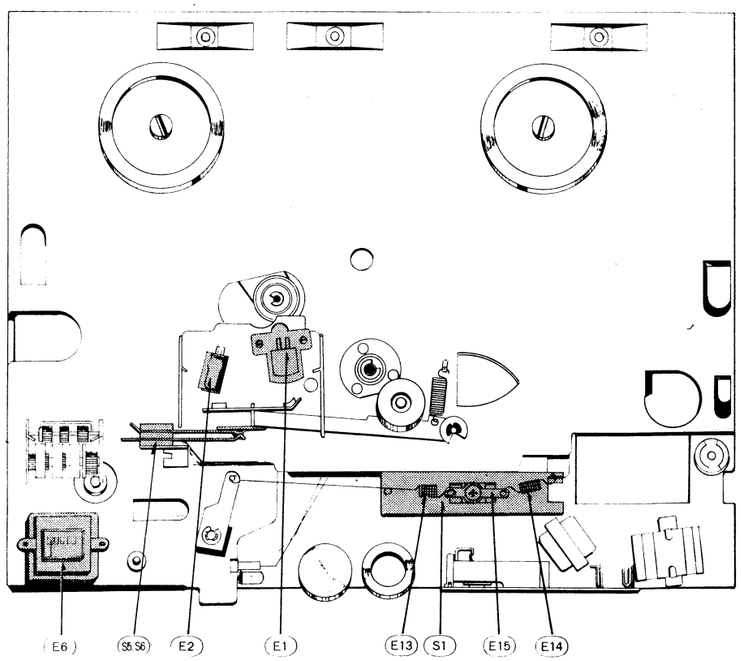


NOTE:

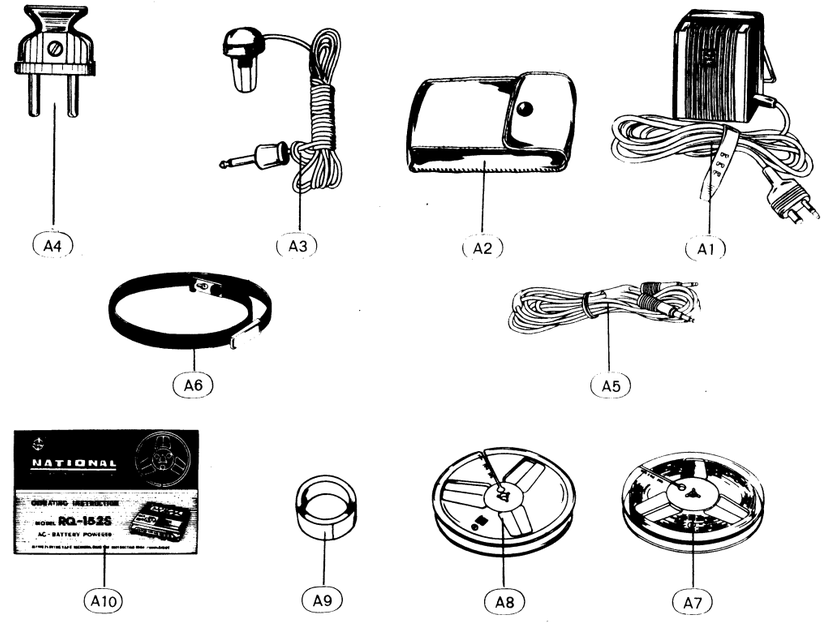
T1 .....Input Transformer.
T2 .....Output Transformer.
T3 .....Osillator Transformer.
T4 .....Power Transformer.
S1-1～S1-6 ...Record/Playback Selector Switch.
(Shown in Playback position)
S2 .....Power ON-OFF Switch.
(Shown in Playback, Record and Rewind)
S3 .....Stop Switch.
(Shown in Playback and Record position)
S4 .....A.C D.C Selector Switch.
(Shown in Battery position Coupled with Relay)
S5 .....Rewind Switch.
(Shown in Playback, Record and Stop position)
S6 .....Rewind Switch.
(Shown in Playback, Record and Stop position)
S7 .....Sound Monitor Switch.
(Shown in Sound Monitor ON, Coupled with VR1)
S8 .....Voltage Selector Switch.
RY .....D.C Relay.

ELECTRICAL PARTS LOCATION





ACCESSORIES



VOLTAGE CHART

Check Point	Voltage in PLAY mode	Voltage in RECORD mode	Tolerance
1	– 1.4 V	– 1.4 V	± 10 %
2	– 0.5 V	– 0.5 V	± 10 %
3	– 4.0 V	– 4.0 V	± 10 %
4	– 2.75 V	– 2.75 V	± 10 %
5	– 1.55 V	– 1.55 V	± 10 %
6	– 6.8 V	– 6.8 V	± 10 %
7	– 1.1 V	– 1.1 V	± 10 %
8	– 8.0 V	– 8.0 V	± 10 %
9	0	– 6.5 V	± 10 %
10	0	– 0.35 V	± 10 %

COMPONENT PACKING